

DEPARTMENT OF TRANSPORTATION

Federal Railroad Administration

49 CFR Parts 222 and 229

Docket No. FRA-1999-6439, Notice No. 8

[RIN 2130-AA71]

Use of Locomotive Horns at Highway-Rail Grade Crossings

AGENCY: Federal Railroad Administration (FRA), Department of Transportation (DOT).

ACTION: Interim Final Rule.

SUMMARY: FRA is issuing rules to require that a locomotive horn be sounded while a train is approaching and entering a public highway-rail crossing. The rules also provide for an exception to the above requirement in circumstances in which there is not a significant risk of loss of life or serious personal injury, use of the locomotive horn is impractical, or safety measures fully compensate for the absence of the warning provided by the horn. This rule is required by law.

DATES: The effective date is **[INSERT DATE ONE YEAR FROM THE DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

Written Comments: Comments must be received by **[INSERT DATE 60 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER]**. Comments received after that date will be considered to the extent possible without incurring additional expense or delay.

Public Hearing: FRA intends to hold a public hearing in Washington, D.C. to allow interested parties the opportunity for oral comment on issues addressed in the interim final rule. The date

and specific location of the hearing will be set forth in a forthcoming notice that will be published in the FEDERAL REGISTER and posted on FRA's web site (<http://www.fra.dot.gov>).

ADDRESSES: You may submit comments identified by DOT DMS Docket Number FRA-1999-6439 by any of the following methods:

§ Web site: <http://dms.dot.gov>. Follow the instructions for submitting comments on the DOT electronic docket site.

§ Fax: 1-202-493-2251

§ Mail: Docket Management Facility; US Department of Transportation, 400 Seventh Street, S.W., Nassif Building, Room PL-401, Washington, DC 20590-001.

§ Hand Delivery: Room PL-401 on the plaza level of the Nassif Building, 400 Seventh Street, S.W., Washington, DC, between 9 am and 5 pm, Monday through Friday, except Federal Holidays.

§ Federal e-Rulemaking Portal: Go to <http://www.regulations.gov>. Follow the online instructions for submitting comments.

Instructions: All submissions must include the agency name and docket name and docket number or Regulatory Identification Number (RIN) for this rulemaking. For detailed instructions on submitting comments and additional information on the rulemaking process, see the Public Participation heading of the Supplementary Information section of this document. Note that all comments received will be posted without change to <http://dms.dot.gov>, including any personal information provided. Please see the Privacy Act heading under Regulatory Notices.

Docket: For access to the docket to read background documents or comments received, go to <http://dms.dot.gov> at any time or to Room PL-401 on the plaza level of the Nassif Building, 400 Seventh Street, SW, Washington, DC, between 9 am and 5 pm, Monday through Friday, except Federal Holidays..

FOR FURTHER INFORMATION CONTACT: Ron Ries, Office of Safety, FRA, 1120 Vermont Avenue, N.W., Washington, D.C. 20590 (telephone: 202-493-6299); or Kathryn Shelton or Mark Tessler, Office of Chief Counsel, FRA, 1120 Vermont Avenue, N.W., Washington, D.C. 20590 (telephone: 202-493-6038).

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1. Background

On January 13, 2000, FRA published a Notice of Proposed Rulemaking (NPRM) in the Federal Register (65 FR 2230) addressing the use of locomotive horns at public highway-rail grade crossings. This rulemaking was mandated by Public Law 103-440, which added ' 20153 to title 49 of the United States Code. The statute requires the Secretary of Transportation (whose authority in this area has been delegated to the Federal Railroad Administrator (49 CFR '1.49), to issue regulations to require the use of locomotive horns at public grade crossings, but gives the agency the authority to make reasonable exceptions.

In accordance with the Administrative Procedure Act (5 U.S.C. 553), FRA solicited written comments from the public. By the close of the public comment period on May 26, 2000, almost 3,000 comments had been filed with the agency regarding this rule and its associated

Draft Environmental Impact Statement. As is FRA's practice, FRA held the public docket open for late filed comments and considered them to the extent possible.

Because the NPRM was the subject of substantial and wide-ranging public interest, FRA took unprecedented steps to ensure that the views of the affected public would be heard and considered in development of this interim final rule. FRA conducted a series of public hearings throughout the United States in which local citizens, local and State officials, and members of the U.S. House of Representatives and Senate testified. Twelve hearings were held (Washington, D.C.; Fort Lauderdale, Florida; Pendleton, Oregon; San Bernadino, California; Chicago, Illinois (four hearings in the greater Chicago area); Berea, Ohio; South Bend, Indiana; Salem, Massachusetts; and Madison, Wisconsin) at which more than 350 people testified. The extent of public comment and testimony throughout the country is evidence of the wide-ranging public interest in this rulemaking.

Because the vast majority of people reading this document will not have the benefit of having the NPRM at hand, a portion of the A Background@ section which appeared in the proposed rule is being repeated here (with updated data, where appropriate) in order to provide the necessary perspective in which to view Congress' mandate and the resulting rule.

Approximately 4,000 times per year, a train and a highway vehicle collide at one of this country's 251,000 public and private highway-rail grade crossings. Of those crossings, more than 153,000 are public at-grade crossings-- those crossings in which a public road crosses railroad tracks at grade. During the years 1997 through 2001, there were 17,601 grade crossing collisions in the United States. These collisions are one of the greatest causes of death associated with railroading, resulting in more than 400 deaths each year. For example, in the 1997-2001 period, 2,140 people died in these collisions. Another 6,615 people were injured.

Approximately 50 percent of collisions at highway-rail intersections occur at those intersections equipped with active warning devices such as bells, flashing lights, or gates (approximately 62,000 crossings).

Compared to a collision between two highway vehicles, a collision with a train is forty times more likely to result in a fatality. The average freight locomotive weighs between 140 and 200 tons, compared to the average car weight of one to two tons. Many freight trains weigh in excess of ten thousand tons. Any highway vehicle, even a large truck, would be crushed when struck by a moving train. The laws of physics compound the likelihood that a motor vehicle will be crushed in a collision with a moving train. The train's weight, when combined with the likelihood that the train will not be able to stop to avoid a collision, results in the potential for severe injury or death in virtually every collision (it takes a one-hundred car train traveling 30 miles per hour approximately half a mile to stop--at 50 miles an hour that train's stopping distance increases to one and a third miles).

FRA is responsible for ensuring that America's railroads are safe for both railroad employees and the public. FRA shares with the public the responsibility to confront the compelling facts surrounding grade crossing collisions.

In 1990, as part of FRA's crossing safety program, the agency studied the impact of train whistle bans (i.e., State or local laws prohibiting the use of train horns or whistles at crossings) on safety in Florida. (In this document the terms "whistle" and "horn" are used interchangeably to refer to the air powered locomotive audible warning device required to be installed on locomotives by 49 CFR 229.129, and to steam whistles required to be installed on steam locomotives by 49 CFR 230.121. These terms do not refer to a locomotive bell, which has value as a warning to pedestrians but which is not designed to provide a warning over long distances.)

FRA had previously recognized the locomotive horn's contribution to rail safety by requiring that lead locomotives be equipped with an audible warning device, 49 CFR 229.129, and exempting the use of whistles from Federal noise emission standards "when operated for the purpose of safety." 49 CFR 210.3(b)(3). The Florida study, which is discussed below (and which has been filed in the docket), documented how failing to use locomotive horns can significantly increase the number of collisions.

2. Who is at Risk in a Grade Crossing Collision?

Many people, including a number of commenters to the NPRM, have expressed the view that highway drivers who disobey the law and try to beat a train through a crossing should not be protected at the expense of the peace and quiet of communities that parallel railroad tracks. FRA agrees that drivers who unlawfully enter grade crossings should be punished in accordance with appropriate traffic laws. However, strong public policy reasons argue in favor of reasonable measures to protect all who are put at risk at grade crossings, even drivers who disregard warning devices.

Overlooked in this debate are the many innocent victims of crossing collisions, including automobile and railroad passengers and railroad crews who, despite performing their duties correctly, are usually unable to avoid the collisions. Nationally, from 1994 to 1998, eight railroad crewmembers died in collisions at highway-rail crossings, and 570 crewmembers were injured. A number of locomotive engineers have commented that they or their colleagues have had to deal with the trauma associated with helplessly watching people being killed beneath their trains. Two hundred railroad passengers were also injured and two died. In Bourbonnais, Illinois, in 1999, eleven passengers died in their sleeper car following a collision with a truck at a highway-rail crossing. In addition, since approximately one-half of all collisions occur at grade

crossings that are not fully equipped with warning devices, some of the drivers involved in these collisions may have been unaware of the approaching train.

Property owners living near railroad rights-of-way can also be at risk. For example, on December 1, 1992, in Hiebert, Alabama, a freight train collided with a lumber truck. Three locomotives and nine rail cars were derailed, releasing 10,000 gallons of sulfuric acid into a nearby water supply. Residents living near the derailment site had to be evacuated because of the chemical spill. Even where the locomotive consist is not derailed in the initial collision with the highway vehicle, application of the train's emergency brake can result in derailment and harm to persons and property along the right-of-way.

Law-abiding motorists can also be endangered in crossing collisions. On March 17, 1993, an Amtrak train collided with a tanker truck in Fort Lauderdale, Florida. Five people died when 8,500 gallons of burning fuel from the tanker truck engulfed cars waiting behind the crossing gates.

Highway passengers can also be victims. On December 14, 1995, in Ponchatoula, Louisiana, five people were killed when their truck was hit by an Amtrak train. Among the dead were three children who were passengers in the truck.

In making a decision on the use of locomotive horns, all of the competing interests must be reasonably considered. Those whose interests will be affected by this rule include those who may be disturbed by the sounding of locomotive horns and all of those who may suffer in the event of a collision: pedestrians using the crossing, the motor vehicle driver and passengers, those in adjacent vehicles, train crews, and those living or working nearby.

3. FRA's Study of the Florida Train Whistle Ban.

Effective July 1, 1984, Florida authorized local governments to ban the nighttime use of whistles by intrastate trains approaching highway-rail grade crossings equipped with flashing lights, bells, crossing gates, and highway signs that warned motorists that train whistles would not be sounded at night. Fla. Stat. ' 351.03(4)(a) (1984). After enactment of this Florida law, many local jurisdictions passed whistle ban ordinances.

In August 1990, FRA issued a study of the effect of the Florida train whistle ban up to the end of 1989. The study compared the number of collisions at crossings subject to bans with four control groups. FRA was trying to determine the impact of the whistle bans and to eliminate other possible causes for any increase or decrease in collisions.

Using the first control group, FRA compared collision records for time periods before and during the bans. FRA found there were almost three times more collisions after the whistle bans were established, a 195 percent increase. If collisions continued to occur at the same rate as before the bans began taking effect, it was estimated that 49 post-ban collisions would have been expected. However, 115 post-ban collisions occurred, leaving 66 crossing collisions statistically unexplained. Nineteen people died and 59 people were injured in the 115 crossing collisions. Proportionally, 11 of the fatalities and 34 of the injuries could be attributed to the 66 unexplained collisions.

In the second control group, FRA found that the daytime collision rates remained virtually unchanged for the same highway-rail crossings where the whistle bans were in effect during nighttime hours.

The third control group showed that nighttime collisions increased only 23 percent along the same rail line at crossings with no whistle ban.

Finally, FRA compared the 1984 through 1989 accident record of the Florida East Coast Railway Company (FEC), which, because it was considered an A intrastate@ carrier under Florida law, was required to comply with local whistle bans, with that of the parallel rail line of interstate carrier, CSX Transportation Company (CSX), which was not subject to the whistle ban law. By December 31, 1989, 511 of the FEC's 600 gate-equipped crossings were affected by whistle bans. Collision data from the same period were available for 224 similarly equipped CSX crossings in the six counties in which both railroads operate. As noted above, FRA found that FEC's nighttime collision rate increased 195 percent after whistle bans were imposed. At similarly equipped CSX crossings, the number of collisions increased 67 percent.

On July 26, 1991, FRA issued an emergency order to end whistle bans in Florida. Notice of that emergency order (Emergency Order No. 15) was published in the Federal Register at 56 FR 36190. FRA is authorized to issue emergency orders where an unsafe condition or practice creates "an emergency situation involving a hazard of death or injury." 49 U.S.C. ' 20104. FRA acted after updating its study with 1990 and initial 1991 collision records and finding that another twelve people had died and thirteen were injured in nighttime collisions at whistle ban crossings. During this time, a smaller study, conducted by the Public Utility Commission of Oregon, corroborated FRA's findings and led to the cessation of State efforts to initiate a whistle ban in Oregon.

FRA's emergency order required that trains operated by the FEC sound their whistles when approaching public highway-rail grade crossings. This order preempted State and local laws that permitted the nighttime ban on the use of locomotive horns.

Twenty communities in Florida petitioned for a review of the emergency order. During this review, FRA studied other potential causes for the collision increase. FRA's closer look at the issue strengthened the conclusion that whistle bans were the likely cause of the increase.

For example, FRA subtracted collisions that whistles probably would not have prevented from the collision totals. Thirty-five collisions where the motor vehicle was stopped or stalled on the crossing were removed from the totals. Eighteen of these collisions occurred before and 17 were recorded during the bans. When these figures were excluded, the number of collisions in the pre-ban period changed from 39 to 21, and the number of collisions in the post-ban period decreased from 115 to 98. Collisions, which whistles could have prevented, therefore, totaled 98 collisions as compared to 21 collisions in the pre-ban period; this represents a 367 percent increase, compared to the 195 percent increase initially calculated.

Similarly, if collisions where the motor vehicle hit the side of the train were also excluded (nine in the pre-ban period and 26 in the post-ban period) as being unlikely to have been prevented by train whistles, the pre-ban collision count became 12 versus 72 in the whistle ban period. The increase in collisions caused by the lack of whistles then became 500 percent.

FRA's data, however, showed that, before the ban, highway vehicles on average, struck the sides of trains at the 37th train car behind the locomotive. After the ban took effect, 26 vehicles struck trains, and on average, struck the twelfth train car behind the locomotive. This indicated that motor vehicles are more cautious at crossings if a locomotive horn is sounding nearby. Before the whistle bans, highway vehicles tended to hit the side of the train after the whistling locomotive had long passed through the crossing. After the ban took effect, highway traffic hit the train much closer to the now silent locomotive -- at the 12th car. The number of

motor vehicles hitting the sides of trains also increased nearly threefold after the ban was established.

FRA also considered collisions involving double tracked grade crossings where two trains might approach at the same time. Since a driver's view of the second train might be blocked, hearing the second train's whistle could be the only warning available to an impatient driver. FRA's Florida study found the number of second train collisions for the pre-ban period was zero, while four were reported for the period the bans were in effect.

Several Florida communities asked whether train speed increased collisions. FRA research has well established, as discussed below, that train speed is not a factor in determining the likelihood of a traffic collision at highway-rail crossings equipped with active warning devices that include gates and flashing lights. Speed, however, is a factor in determining the severity of a collision.

FRA also considered population growth in Florida, but found it was not a factor. Daytime collision rates were not increasing at the very same crossings that had whistle bans at night. If population was a factor, then the daytime numbers should have increased dramatically as well. FRA also reviewed the number of fatal highway collisions, and registered drivers and motor vehicles and found no increases that either paralleled or explained the rise in nighttime crossing collisions.

In the first two years after July 1991, when FRA issued its emergency order-prohibiting whistle bans in Florida, collision rates dropped dramatically to pre-ban levels. In the two years before the emergency order, there were 51 nighttime collisions. In the two years after, there were only 16. Daytime collisions dropped slightly from 34 collisions in the two years before the emergency order, to 31 in the following two years.

4. FRA's Nationwide Study of Train Whistle Bans.

FRA's Florida study raised the concern that whistle bans could be increasing collisions in other locations. Given the wide difference between grade crossing conditions from one community to another, FRA did not assume that the Florida results would be true at every whistle ban crossing. FRA began a nationwide effort to locate grade crossings subject to whistle bans and study collision information for those crossings. The Association of American Railroads (AAR) joined the FRA in that effort.

The AAR surveyed the rail industry and found 2,122 public grade crossings subject to whistle bans for some period of time between January 1988 and June 30, 1994. This total did not include the 511 public crossings that were subject to whistle bans in Florida that FRA had already studied.¹ The study also did not include crossings on small, short line railroads, and certain regional railroads, which did not report to the AAR. The nationwide survey found whistle bans in 27 States that affected 17 railroads. FRA studied collisions occurring between January 1988, and June 30, 1994.

Two thousand and four of the crossings were subject to 24-hour whistle bans. Another 118 grade crossings were subject to nighttime-only bans. The States with the largest number of whistle ban crossings were Illinois, Wisconsin, Kentucky, New York, and Minnesota. More than half of the crossings were on three railroads: CSX, Consolidated Rail Corporation (Conrail), and

¹The FEC crossings comprised virtually all of the whistle ban crossings in Florida. For simplicity, FRA elected to remove all Florida crossings from the national study. Since it became apparent from this initial national review that the FEC experience represented the high end of ban impacts, and since those impacts had been mitigated by E.O. 15 with respect to the later study period, FRA continued to remove both Florida ban crossings and Florida train horn crossings from all subsequent studies. Florida public crossings represent 2.6% of public crossings, so this omission should not materially affect the national analysis.

Soo Line. A report covering the nationwide study was issued in April 1995. FRA found that whistle ban crossings averaged 84 percent more collisions than similar crossings with no bans. There were 948 collisions at whistle ban crossings during the period studied. Sixty-two people died in those collisions and 308 were injured. Collisions occurred on every railroad with crossings subject to whistle bans, and in 25 of the 27 States where bans were in effect.

Since the 1995 study, FRA continued to analyze relevant data. Over the period of 1992-1996, there were 793 collisions at 2,366 crossings subject to whistle bans. These collisions resulted in the fatalities and injuries displayed in Table 1, as well as more than \$2 million in motor vehicle damages.

Table 1. Collision Injuries and Fatalities by Type of Person Involved

Type of Person Involved	Injuries	Fatalities
Motorist	258	56
Pedestrian	17	41
Railroad employee	56	0

The types of collisions which took place at whistle ban crossings and the resulting casualties are shown in Table 2 (casualty figures in this table exclude casualties to railroad employees). It is interesting to note that the mean train speed (train speed is positively correlated with fatalities) varies by type of collision. Of the injuries and fatalities shown in Table 2, 11 injuries and 5 deaths occurred when the vehicle was hit by a second train.

Table 2. Type of Collision

Type of Collision	Injuries	Fatalities	Mean Train Speed
Motor vehicle struck train	51	8	15.5
Train struck motor vehicle	224	89	25.4

The driver was killed in the collision in 42 instances (5.3% of collisions); the remaining 55 fatalities were either passengers or pedestrians. The driver passed standing vehicles to go over the crossing in 37 of the collisions (4.7%). The driver was more likely to be killed when moving over the crossing at the time of the collision (35 of the driver fatalities), rather than when the vehicle was stopped or stalled at the crossing, and in most of the collisions (69.9%) at whistle-ban crossings the driver was moving over the crossing. Additionally, in almost every collision (97%), a warning device (either active or passive) was located on the vehicle's side of the crossing. This supports the theory that the warning given by the train horn could deter the motorist from entering the crossing.

Collisions which took place when the motorist was moving over the crossing were more likely to be fatal (72% of the fatalities). This type of collision was also more likely to result in injury with 209 of the 258 motorist injuries occurring under these circumstances. These are the types of collisions the proposed rule is designed to prevent. Motorists that fail to notice or heed the warning devices in place at a crossing may be deterred by the sound of a train horn. The motorist is also given information by the horn about the proximity, speed, and direction of the train.

FRA's study indicated that the installation of automatic traffic gates at crossings with whistle bans was more than twice the national average. Forty percent of the whistle ban crossings had gates compared to 17 percent nationally.

FRA found 831 crossings where whistle sounding had at one time been in effect, but where the practice had changed during the January 1988 through June 1994 study period. In 87 percent of the cases, bans were no longer in effect. A before-and-after analysis comparing collision rates showed an average of 38 percent fewer collisions when whistles were sounded indicating that resuming use of the whistles had a .38 effectiveness rate in reducing collisions. This finding paralleled the Florida experience.

FRA also rated whistle ban grade crossings according to an "Accident Prediction Formula." The formula predicts the statistical likelihood of having a collision at a given highway-rail grade crossing. The physical characteristics of each crossing were considered in the formula, including the number of tracks and highway lanes, types of warning devices, urban or rural location, and whether the roadway was paved. Also considered were operational aspects, such as, the number of highway vehicles, and the number, type, time of day, and maximum speed of trains using the crossing. The formula was developed using data from thousands of collisions spanning many years. FRA then ranked the 167,000 public crossings in the national inventory at that time in an identical manner. Both the whistle ban crossings and the national inventory crossings were then placed into one of ten groups ranging from low-risk to high-risk.

FRA compared the number of collisions occurring within each of the ten groups of crossings, over a five year period from 1989 through 1993, and found that for nine out of the ten risk groups, the whistle ban crossings had significantly higher collision rates than the crossings

with no whistle bans. On average, the risk of a collision was found to be 84 percent greater at crossings where train horns were silenced. Another way to interpret this difference would be to say that locomotive horns had a .46 effectiveness rate in reducing the rate of collisions.

FRA was concerned about the higher risk disclosed by the nationwide study. From its vantage point, FRA was able to see the elevated risk associated with whistle bans, which might not be apparent to local communities. While crossing collisions are infrequent events at individual crossings, the nationwide study, and the experience in Florida, showed they were much less infrequent when train horns were not sounded.

FRA conducted an outreach program in order to promptly share this information with all communities where bans were in effect. In addition to issuing press releases and sending informational letters to various parties, FRA met with community officials and participated in town meetings. Along with the study's findings, information about the upcoming rule requiring the sounding of train horns was presented, including provisions for Supplemental Safety Measures (SSMs) that could be implemented by communities to compensate for silenced train horns and allow bans to remain in effect.

From the outreach effort, FRA gained a clearer understanding of local concerns and issues. Many of those concerns were expressed in person and others were submitted in writing to FRA's train horn docket. Another result of the outreach effort was the identification by communities and State and local governmental agencies of 664 additional crossings that were purportedly subject to whistle bans, but not included in the nationwide study. About 95 percent of these were located in the city and suburbs of Chicago, Illinois. Many carry a high volume of commuter rail traffic.

Prior to issuing the NPRM, FRA updated its analysis of safety at whistle ban crossings, expanding it to include data for all the Chicago Region crossings as well as for a few other newly identified locations.

FRA also refined its procedure by conducting separate analyses for three different categories of warning devices in place at the crossings (e.g., automatic gates with flashing lights; flashing lights or other active devices without gates; and passive devices only, such as a crossbucks or other signs). By separating crossings according to the different categories of warning devices installed, FRA was better able to identify the level at which locomotive horns increase safety at crossings with different types of warning devices and thus the level at which substitutes for the horn must be effective in order to fully compensate for the lack of a horn at those crossings. In addition, FRA excluded from the analysis certain collisions where the sounding of the train horn would not have been a deterrent to the collisions. These included cases where there was no driver in the vehicle and collisions where the vehicle struck the side of the train beyond the fourth locomotive unit (or railcar). FRA also excluded events where pedestrians were struck. Pedestrians, compared to vehicle operators, have a greater opportunity to see and recognize an approaching train because they can look both ways from the edge of the crossing, closer than the motorist sitting at least a car hood length or more back from the edge. They can also stop or reverse their direction more quickly than a motorist if they have second thoughts about crossing safely.

Data for the five-year time period from 1992 through 1996 were used for the updated analysis in place of the older data of the 1995 Nationwide Study. For the updated analysis, the collision rate for whistle ban crossings in each device category was compared to similar

crossings in the national inventory using the ten-range risk level method used in the original study.

The analysis showed that an average of 62 percent more collisions occurred at whistle ban crossings equipped with automatic gates and flashing lights than at similarly equipped crossings across the nation without bans. For purposes of the NPRM, FRA used this value as the increased risk associated with whistle bans instead of the 84 percent cited in the Nationwide Study of Train Whistle Bans released in April 1995. FRA determined that 62 percent was appropriate because it represents the elevated risk associated with crossings with automatic gates and flashing lights, which is the only category of crossings that will be eligible under this rule for new quiet zones (except for certain crossings where train speeds do not exceed 15 miles per hour).

The updated analysis also indicated that whistle ban crossings without gates, but equipped with flashing light signals and/or other types of active warning devices, on average, experienced 119 percent more collisions than similarly equipped crossings without whistle bans. This finding made clear that the train horn was highly effective in deterring collisions at non-gated crossings equipped only with flashing lights. The only exception to this finding was in the Chicago Region where collisions appeared from available data to be 16 percent less frequent. This will be discussed in greater detail below.

In comparing the collision differences at crossings with gates and those without gates, FRA found that about 55 percent of the collisions at crossings with gates occurred when motorists deliberately drove around lowered gates. These collisions occurred 128 percent more often at crossings with whistle bans than at other crossings. Another 18 percent of the collisions occurred while motorists were stopped on the crossings, probably waiting for vehicles ahead to

move forward. There were smaller percentages of collisions involving stalled and abandoned vehicles. Suicides are not included in the collision counts. At crossings equipped with flashing signal lights and/or other active warning devices, but not gates, collisions occurred 119 percent more often at crossings subject to bans. A distinction should be made between the two circumstances. In the case of lowered gates, it is the motorist's decision to circumvent a physical barrier to take a clearly unsafe and unlawful action that can result in a collision. However, in the case of crossings with flashing light signals and/or other active devices, collisions may be more the result of a motorist's error in judgment rather than a deliberate violation of the State's motor vehicle laws. The ambiguity of flashing lights at crossings, which in other traffic control situations indicate that the motorist may proceed after stopping, when safe to do so, coupled with the difficulty of correctly judging the rate of approach of a large object such as a locomotive, may contribute to this phenomenon. FRA's collision data suggested that the added warning provided by the train horn is most critical at crossings without gates but which are equipped with other types of active warning devices.

By separating crossings according to the different categories of warning devices installed, FRA was better able to identify the level at which locomotive horns increase safety at gated crossings and thus the level at which substitutes for the horn must be effective in order to fully compensate for the lack of a horn at those crossings.

For crossings with passive signs as the only type of warning device, the updated study indicated an average of 27 percent more collisions for crossings subject to whistle bans. This is the smallest difference identified between crossings with and without whistle bans. These crossings account for about one fourth of the crossings with whistle bans. Typically, they are the crossings with the lowest aggregate risk of collision because the installation of active warning

devices usually follows a sequence where the highest risk crossings are equipped first. Two determinants of crossing risk are the amount of train traffic and highway traffic at a crossing. Often, crossings with only passive warning devices are located on seldom used sidings and industrial tracks and/or on roadways with relatively low traffic levels. FRA believes this may be the reason that the difference in the numbers of collisions at whistle ban and non-ban crossings is so much less than for the other crossing categories. For crossings with passive warnings where trains do not exceed 15 miles per hour and where railroad personnel use flags to warn motorists of the approach of a train, whistle bans would entail a small risk of a collision resulting in an injury. However, at crossings with passive warnings and with higher train speeds, motorists would have no warning of the approach of a train if the train horn were banned. At such crossings, in order to ensure their safety, motorists must search for and recognize an approaching train, and then visually judge whether it is moving, and if so, estimate its arrival time at the crossing, all based only on visual information which may be impaired by hills, structures, vegetation, track curvature, and road curvature as well as by sun angle, weather conditions, or darkness. The driver's decision to stop must be made at a point sufficiently in advance of reaching the crossing to accommodate the vehicle's stopping distance. If other vehicles are following, a sudden decision to stop could result in a rear-end collision with the vehicle being pushed into the path of the train. While FRA's data indicated that the smallest increase in collision frequency is associated with whistle bans at passive crossings, logic suggested that the banning of train horns at passive crossings could entail a much more significant safety risk per unit of exposure (vehicle crossings per train movement). Without the audible train horn warning, motorists would have no indication of the imminent arrival of a train beyond what they could

determine visually. For motorists unfamiliar with whistle bans who encounter passive crossings where horns are not sounded, there would be an even greater risk.

5. Statutory Mandate

After reviewing FRA's Florida study, Congress addressed the issue. On November 2, 1994, Congress passed Public Law 103-440 (Act), which added 20153 to title 49 of the United States Code. (Subsections (I) and (j) were added on October 9, 1996 when ' 20153 was amended by Public Law 104-264.) The Act requires the use of locomotive horns at public grade crossings, but gives FRA the authority to make reasonable exceptions. Section 20153 of title 49 of the United States Code states as follows:

20153. Audible warning at highway-rail grade crossings.

(a) DEFINITIONS.--As used in this section--

(1) the term "highway-rail grade crossing" includes any street or highway crossing over a line of railroad at grade;

(2) the term "locomotive horn" refers to a train-borne audible warning device meeting standards specified by the Secretary of Transportation; and

(3) the term supplementary safety measure (SSM) refers to a safety system or procedure, provided by the appropriate traffic control authority or law enforcement authority responsible for safety at the highway-rail grade crossing, that is determined by the Secretary to be an effective substitute for the locomotive horn in the prevention of highway-rail casualties. A traffic control arrangement that prevents careless movement over the crossing (e.g., as where adequate median barriers prevent movement around crossing gates extending over the full width of the lanes in the particular direction of travel), and that conforms to standards prescribed by the Secretary under this subsection, shall be deemed to constitute an SSM. The following do not, individually or in

combination, constitute SSMs within the meaning of this subsection: standard traffic control devices or arrangements such as reflectorized crossbucks, stop signs, flashing lights, flashing lights with gates that do not completely block travel over the line of railroad, or traffic signals.

(b) REQUIREMENT.--The Secretary of Transportation shall prescribe regulations requiring that a locomotive horn shall be sounded while each train is approaching and entering upon each public highway-rail grade crossing.

(c) EXCEPTION.--(1) In issuing such regulations, the Secretary may except from the requirement to sound the locomotive horn any categories of rail operations or categories of highway-rail grade crossings (by train speed or other factors specified by regulation)--

(A) that the Secretary determines not to present a significant risk with respect to loss of life or serious personal injury;

(B) for which use of the locomotive horn as a warning measure is impractical; or

(C) for which, in the judgment of the Secretary, SSMs fully compensate for the absence of the warning provided by the locomotive horn.

(2) In order to provide for safety and the quiet of communities affected by train operations, the Secretary may specify in such regulations that any SSMs must be applied to all highway-rail grade crossings within a specified distance along the railroad in order to be excepted from the requirement of this section.

(d) APPLICATION FOR WAIVER OR EXEMPTION.--Notwithstanding any other provision of this subchapter, the Secretary may not entertain an application for waiver or exemption of the regulations issued under this section unless such application shall have been submitted jointly by the railroad carrier owning, or controlling operations over, the crossing and by the appropriate traffic control authority or law enforcement authority. The Secretary shall not

grant any such application unless, in the judgment of the Secretary, the application demonstrates that the safety of highway users will not be diminished.

(e) DEVELOPMENT OF SUPPLEMENTARY SAFETY MEASURES.--(1) In order to promote the quiet of communities affected by rail operations and the development of innovative safety measures at highway-rail grade crossings, the Secretary may, in connection with demonstration of proposed new SSMs, order railroad carriers operating over one or more crossings to cease temporarily the sounding of locomotive horns at such crossings. Any such measures shall have been subject to testing and evaluation and deemed necessary by the Secretary prior to actual use in lieu of the locomotive horn.

(2) The Secretary may include in regulations issued under this subsection special procedures for approval of new SSMs meeting the requirements of subsection (c)(1) of this section following successful demonstration of those measures.

(f) SPECIFIC RULES.--The Secretary may, by regulation, provide that the following crossings over railroad lines shall be subject, in whole or in part, to the regulations required under this section:

- (1) Private highway-rail grade crossings.
- (2) Pedestrian crossings.
- (3) Crossings utilized primarily by nonmotorized vehicles and other special vehicles.

(g) ISSUANCE.--The Secretary shall issue regulations required by this section pertaining to categories of highway-rail grade crossings that in the judgment of the Secretary pose the greatest safety hazard to rail and highway users not later than 24 months following the date of enactment of this section. The Secretary shall issue regulations pertaining to any other categories of crossings not later than 48 months following the date of enactment of this section.

(h) IMPACT OF REGULATIONS.--The Secretary shall include in regulations prescribed under this section a concise statement of the impact of such regulations with respect to the operation of section 20106 of this title (national uniformity of regulation).

(i) REGULATIONS-- In issuing regulations under this section, the Secretary--

(1) shall take into account the interest of communities that --

(A) have in effect restrictions on the sounding of a locomotive horn at highway-- rail grade crossings; or

(B) have not been subject to the routine (as defined by the Secretary) sounding of a locomotive horn at highway-rail grade crossings;

(2) shall work in partnership with affected communities to provide technical assistance and shall provide a reasonable amount of time for local communities to install SSMs, taking into account local safety initiatives (such as public awareness initiatives and highway-rail grade crossing traffic law enforcement programs) subject to such terms and conditions as the Secretary deems necessary, to protect public safety; and

(3) may waive (in whole or in part) any requirement of this section (other than a requirement of this subsection or subsection (j)) that the Secretary determines is not likely to contribute significantly to public safety.

(j) EFFECTIVE DATE OF REGULATIONS--Any regulations under this section shall not take effect before the 365th day following the date of publication of the final rule.

6. Issuance of Interim Final Rule

FRA is issuing today's rule as an interim final rule, rather than as a final rule. An interim final rule has the same force and effect as a final rule, but differs from a final rule in one principal way - when an interim final rule is issued, comments are solicited and the agency

reserves the right to make changes to the rule in response to the comments received. Because the rule issued today is a logical outgrowth of the NPRM, FRA could have issued it as a final rule. Both the NPRM and interim final rule issued today permit exceptions to the use of the locomotive horn, address the need to mitigate the risk associated with lack of the locomotive horn, provide for implementation of SSMs and ASMs, and address mitigation of risk on a corridor-wide, rather than individual grade crossing basis. Like one major provision of the NPRM, the interim final rule bases the determination of a corridor's risk mitigation goal on FRA's Accident Prediction Formula (APF). However, the interim final rule adds a level of further sophistication to the formula by considering collision severity and permitting quiet zones in part based on a corridor's relationship to a national crossing risk index derived from this severity-weighted APF. A large number of commenters complained that FRA did not sufficiently take into consideration safety history at the crossing. While the APF does take into consideration such past record, the interim final rule builds on the NPRM and resulting comments by placing more weight on the safety record at crossings within a corridor and permitting exceptions based on that safety record. The result - that some quiet zones may be established without the need to implement SSMs or ASMs if the corridor does not pose a significant risk based on a national standard B flows logically from the NPRM's use of the APF and the commenters' clear request to make the entire rule more risk based.

Even though this rule could be issued as a final rule, FRA has determined that the public should have an opportunity to comment on the rule as changed. Because the language in some sections has been revised, FRA, and the final rule, will benefit from the input of the public; FRA has found in the past that public comments often contain suggestions that can improve a regulatory document. Therefore, comments are being solicited on all aspects of this rule [see

Public Participation section]. FRA will review the comments and reserves the right to make revisions when issuing a final rule.

7. Effective Date of This Rule

Because this interim final rule has all the legal attributes of a final rule, the effective date of this rule will be **[INSERT DATE ONE YEAR FROM DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Congress specifically provided for this one-year delay; subsection (j) of 20153, which was added to the basic rulemaking mandate in 1996, provides that any regulations issued under that section shall not take effect before the 365th day following the date of publication of the final rule. Issuing this interim final rule rather than a final rule will not penalize those communities which have waited a number of years for issuance of a rule permitting the creation of quiet zones. They will still be able to establish quiet zones on the same schedule as if a final rule were issued today. Alternatively, issuance of this rule in the form of an interim final rule will not have a significant negative effect on those communities with present whistle bans. FRA has specifically included in the rule sufficient time for those communities to conform to any changes that may be made to the interim final rule in order to enable them to retain their whistle-free crossings.

However, we don't believe Congress intended that FRA delay administrative actions such as working with public authorities and reviewing applications for quiet zones in order to permit communities to institute quiet zones at the earliest possible date after the one year required delay has elapsed. Accordingly, FRA will accept quiet zone applications from public authorities during the one-year delay period. While this interval should enable public authorities to begin planning, they should also be aware that the final rule may contain changes based on comments

to this interim final rule. Because of this uncertainty, FRA will make every effort to issue a final rule expeditiously after the close of the comment period.

8. Rule Summary

The following very brief summary of this interim final rule is provided for the reader's convenience. Because this is merely a summary, it should not be relied on for definitive information regarding compliance with this rule.

- This rule applies to all railroads that operate on the general railroad system of transportation. The rule does not apply to freight railroads and tourist and scenic railroads, which are not on the general railroad system. It does not apply to rapid transit systems in urban areas that are not connected to the general railroad system of transportation. Rapid transit operations sharing tracks with general system railroads at crossings, or sharing crossings with general system railroads are connected to the general system at the crossings and are thus subject to part 222; however, rapid transit operations are not subject to the horn volume requirements of part 229.
- Locomotive horns must be sounded while approaching and entering upon each public highway-rail grade crossing. The horn sound level must be a minimum of 96 dB(A) and no louder than 110 dB(A) measured 100 feet in front of the locomotive and 15 feet above the rail. All locomotives must sound the horn in the standard sequence of two longs, one short, and one long starting at least 15 seconds, but no more than 20 seconds before reaching the grade crossing, however, in no case may the horn be sounded more than 1/4 mile before the crossing.

- A railroad may, with certain exceptions, decide to not sound the locomotive horn at a crossing if the locomotive speed is 15 miles per hour or less and train crew members or equipped flaggers flag the crossing to provide warning of the approaching train to motorists.
- A quiet zone is at least 2 mile in length, although Pre-Rule Quiet Zones may continue unchanged. Except for certain exceptions listed in the rule, each public crossing within a New Quiet Zone must at a minimum be equipped with flashing lights, gates, and signs warning of the absence of locomotive horns. Each public crossing within a Pre-Rule Quiet Zones may retain, but must not downgrade the warning systems in place.
- This rule does not cover horn use at private crossings outside of quiet zones. Their use will continue to be governed by State and local laws and private agreements. However, if a private crossing is within a quiet zone, horn use is restricted at that crossing.
- The rule provides for two types of quiet zones -- Pre-Rule Quiet Zones (consecutive crossings where horns were silenced by state or local law or by formal or informal agreement, and which were in existence as of October 9, 1996 and on **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]** and New Quiet Zones (quiet zones established under the terms of this rule and which do not qualify as Pre-Rule Quiet Zones).
- A quiet zone may be established using SSMs, or in certain cases, ASMs, in two ways: (a) by designation by a public authority (which is the public entity responsible for safety and maintenance of the roadway crossing the railroad tracks

at a public highway-rail grade crossing); or (b) by application to FRA.

- A quiet zone may be designated if (a) supplementary safety measures are applied to every public grade crossing within the quiet zone; (b) the Quiet Zone Risk Index is at, or below, the Nationwide Significant Risk Threshold; or (c) supplementary safety measures are instituted which reduce the Quiet Zone Risk Index to a level at, or below, the Nationwide Significant Risk Threshold, or to the risk level which would exist if locomotive horns sounded at all crossings within the quiet zone. The public authority has discretion as to how the Quiet Zone Risk Index is reduced, and may choose the type of SSM to be applied and the crossings at which they are to be applied in complying with either (a), (b), or (c).
- If a public authority, for whatever reason, cannot comply with the requirements of quiet zone designation, it may apply to FRA for approval to establish a quiet zone using a combination of SSMs, or ASMs (which includes modified SSMs). As in quiet zone designation, the public authority has discretion as to which SSMs or ASMS to apply and where they are to be applied. However, in this case, the public authority's proposal is reviewed by FRA. If FRA determines that the safety improvements will compensate for the absence of the locomotive horn or that the safety improvements will reduce risk to a level at, or below the Nationwide Significant Risk Threshold, a quiet zone may be established.
- A Pre-Rule Quiet Zone will be considered approved and may remain in effect if the quiet zone could qualify for quiet zone designation if it were a New Quiet Zone based on having a Quiet Zone Risk Index at, or below, the Nationwide Significant Risk Threshold or if there haven't been any relevant collisions at the

public crossings within the quiet zone for the past 5 years and the Quiet Zone Risk Index was less than twice the Nationwide Significant Risk Threshold.

- If a Pre-Rule Quiet Zone cannot comply with the requirements for a quiet zone designation as discussed above, the existing horn restrictions may continue on an interim basis. The restrictions may continue for five years if within, three years after publication of this rule, the public authority files with FRA a detailed plan for maintaining the Pre-Rule Quiet Zone (or establishing a New Quiet Zone). Horn restrictions may continue for an additional three years beyond the five-year period if the appropriate State agency provides FRA with a comprehensive statewide implementation plan and physical improvements are made within the quiet zone, or in a quiet zone elsewhere within the State, within three years and four years after publication respectively.
- FRA will annually review every quiet zone established by comparing the Quiet Zone Risk Index to the Nationwide Significant Risk Threshold. If the Quiet Zone Risk Index as last calculated by FRA is at, or above, twice the Nationwide Significant Risk Threshold, or if the Quiet Zone Risk Index is above the Nationwide Significant Risk Threshold, but is lower than twice the Nationwide Significant Risk Threshold and a relevant collision occurred at a crossing within the quiet zone within the preceding five calendar years, the quiet zone will terminate six months after the date of receipt of notification from FRA of the Nationwide Significant Risk Threshold level, unless the public authority files plans to implement SSMs or ASMs within six months and implements such SSMs or ASMs within three years.

- Wayside horns may be installed within a quiet zone if the public authority determines that it is appropriate to do so. Wayside horns may also be used outside of quiet zones in lieu of locomotive horns at crossings equipped with automatic flashing lights and gates. (Wayside horns have not yet been classified by FHWA as traffic control devices. If FHWA does classify them as traffic control devices, the wayside horn must also be approved in the Manual on Uniform Traffic Control Devices (MUTCD) or FHWA must approve experimentations pursuant to section 1A.10 of the MUTCD.)

9. Overview of the Interim Final Rule: Principles, Strategies, and Major Outcomes

A. Usefulness of the Train Horn

This rulemaking was mandated by law, but its impetus derives from a clearly defined safety need. A majority of the States and all railroads have mandated use of the train horn to provide an audible warning at highway-rail crossings. FRA research and analysis, both prior to institution of this rulemaking and during its pendency, has confirmed the beneficial safety impact of the train horn. The National Transportation Safety Board (NTSB) has also supported the need for this warning to motorists.

FRA understands the point made by commenters that the horn cannot be relied on to prevent every accident, and the data confirm that. Nevertheless, the horn is one cue that is often available to the motorist at the decision point; and it should not be withheld absent serious thought about the consequences. There are some circumstances (e.g., restricted view) in which the train horn may be the best, and most convincing, warning to the motorist. Each year a good portion of the accidents at crossings occur when motorists are not convinced by even flashing warning lights and downed gates, and they drive around the gates and are struck by the train they

neither saw nor heard. The train horn, which announces that there is, in fact, a train coming *now* (not switching cars down the track somewhere out of danger) may often be the most effective warning.

FRA understands the sense of frustration among law-abiding citizens who feel that they should not be burdened by train horn noise (or the cost of alternatives) because other citizens violate traffic laws at highway-rail crossings equipped with flashing lights and gates. FRA is a strong proponent of law enforcement at highway-rail crossings. However, the statute clearly contemplates that motorists will be given the additional, often final warning that the train horn provides (or that other safety measures will be instituted), even where warning systems employing flashing lights and gates are present. Further, as a matter of policy, FRA believes that it is appropriate to protect even the unwise from the consequences of their misdeeds where those consequences are especially severe and where society as a whole may bear the burden of those consequences.

As noted elsewhere in this preamble, victims of collisions at highway-rail crossings are not limited to reckless or intoxicated drivers. Indeed, in many cases victims are innocent passengers who have had no control whatsoever over the driver's behavior.

Even though collisions at highway-rail crossings are far more severe in their consequences than the average highway accident, most victims survive. Many incur substantial medical bills and require extended rehabilitation. Costs are borne by the general public through health and disability insurance arrangements, and through higher costs of goods and services provided by employers who must extend sick leave and other benefits. In this regard, many costs associated with casualties that occur in whistle ban jurisdictions are in effect hidden taxes on persons outside those communities over which these costs are spread. From an economic

standpoint, the community enjoys its quiet and, unless measures have been taken to compensate for the silencing of the horn, someone else pays for most of it.

Finally, there can be victims on the trains and in the general community, as well. Collisions between trucks and heavy trains can cause the injury or even death of train crew members. Some collisions at crossings cause trains to derail (the risk is significant when a heavy truck is involved), and cars containing hazardous materials are found in a high percentage of trains. Release of hazardous materials in a community can result in evacuations, property damage and even injury or death. When the collision involves a passenger train, the potential exists for harm to passengers, as well as crew members. Commenters were correct in noting that such events are rare, but the potential for catastrophic event is real; and an important role for safety regulation is to anticipate and mitigate these sorts of risks.

In summary, we all have a stake in preventing collisions at highway-rail crossings; and there is no practical way to transfer all costs to the driver who fails to obey the law, even if that were a desirable thing.

In general, these principles appear to be accepted outside of whistle ban jurisdictions. Train horns continue to sound today at over 98% of public highway-rail crossings, and over 9 million Americans living and working along rail lines are incidentally exposed to the noise from this source. Most communities and residents appear to tolerate these interruptions reasonably well.

B. Incompatibility of Horn Noise with Community Needs

However, two general trends appear to have converged in a manner that is antithetical to community acceptance of train horn noise under certain conditions. First, as a Nation we are becoming more sensitive to disruptive sources of noise in our environment. This reflects success

in building quieter communities and in engineering noise out of daily life (through zoning, building codes, better design of motor vehicles, etc.). Second, as a result of the consolidation of the national rail system since the 1970s, rail traffic has been concentrated on fewer lines, resulting in more train movements through those communities where main lines continue to be operated. Particularly when the train horn is sounded, the number of train movements is clearly a significant factor in the noise load imparted to the community.

For various reasons, there has been a growth in the number of ordinances and arrangements under which train horns are silenced (whistle bans). Further, in many communities where State law currently does not permit whistle bans, relief from the noise associated with train horns is being actively sought by residents and their elected representatives. Fear of losing existing bans, and the desire to silence train horns in some areas without existing bans, have combined to create significant public interest in this proceeding.

The situation of existing whistle ban communities is particularly vexing, because public and private planning decisions have been made with the assumption that horns will be banned. Commenters in the Chicago Region² also called attention to the conflict between sound urban planning, which promotes construction of high density housing near a commuter railroad stations, and very frequent use of the train horn on the extremely active rail lines in that region.

Unfortunately, there is no known strategy for providing audible warning to motorists without also spreading unwanted noise into communities. (The wayside horn can reduce the amount of unwanted noise, but not eliminate it entirely.) Future research may permit refinement of the multi-frequency pattern of contemporary train horns, but FRA has no present information

² The Chicago area, or Chicago Region, is comprised of 6 counties: Cook, DuPage, Lake, Kane, McHenry, and Will.

that suggests a means of providing a clearly identifiable and urgent signal in a motor vehicle using a sound that is pleasing to nearby residents.

C. Crafting Exceptions to Use of the Train Horn

The statute provides direction for adjusting the competing interests of safety and community quiet. Although the statute says unequivocally, the Secretary of Transportation shall prescribe regulations requiring that a locomotive horn shall be sounded while each train is approaching and entering upon each public highway-rail grade crossing; most of the language of the statute has the effect of explaining how exceptions might be crafted. The statute continues:

(1) In issuing such regulations, the Secretary may except from the requirement to sound the locomotive horn any categories of rail operations or categories of highway-rail grade crossings (by train speed or other factors specified by regulation)--

(A) that the Secretary determines not to present a significant risk with respect to loss of life or serious personal injury;

(B) for which use of the locomotive horn as a warning measure is impractical; or

(C) for which, in the judgment of the Secretary, SSMs fully compensate for the absence of the warning provided by the locomotive horn.

The last of these exceptions substitution of supplementary (or alternative) safety measures was at the heart of the NPRM and remains the best means of reconciling safety and community quiet. As explained below, this interim final rule seeks to make the list of other safety measures as flexible and cost effective as possible.

The second exception, which refers to a determination of impracticability, is a criterion of limited application. It is impractical to provide effective warning by sounding the horn if it is necessary to back a mile-long train over a crossing (so the crossing needs to be flagged), and it is

impractical to provide a warning of suitable duration prior to the train's arrival in the case of a 110 mph passenger train (so active warning devices and a sealed corridor strategy are strongly recommended, whether or not the horn is used). But in most other scenarios, the train horn will serve its purpose if sounded. Some commenters invited FRA to consider the cost of SSMs as a test of impracticability, but that is really a policy or political objection, not one going to the practicability of sounding the train horn and thereby alerting the motorist. FRA believes that the suggested reading of impractical is not appropriate and would result in an enormous increase in safety risk by permitting train horns to be banned routinely without the need to take compensating measures.

The first exception, absence of significant risk with respect to loss of life or serious personal injury, was relied upon in the NPRM only with respect to very limited circumstances (but comments were solicited regarding other options). As a result of testimony and written comments received from the public, including elected and appointed representatives of State and local governments; FRA has reviewed in some detail whether this criterion should be given greater effect in the final rule. The statute clearly does not require the exclusion of all risk, and FRA agrees that it is best to interpret and implement this exception, if possible, in a manner that is not in conflict with the general approach taken by the Congress and the Department of Transportation (DOT) with respect to other safety laws and regulations addressing public safety.

In general, DOT and other Executive Branch departments and agencies must consider costs and benefits before issuing regulations. This is true even where statutes have mandated that rules on particular topics be issued, because in most cases the Congress has left the means of implementation to the agencies. The present rulemaking involves a much more specific mandate than typically embodied in safety legislation. Nevertheless, FRA did consider costs and benefits

in crafting the proposed rule (and found that, overall, investments in safety systems used as a substitute for the horn would be recovered). However, in the NPRM, FRA did not focus sharply on the costs and benefits for those communities where the underlying risk of a casualty-producing collision is comparatively low. Some commenters in areas with existing bans responded with the criticism to the effect that, while some other community might recover its costs, for the particular community the existing risk at crossings is very low and no expenditure is warranted.

In this interim final rule FRA has sought to afford greater recognition to situations where the risk of serious injury is low. In so doing, FRA has been conscious of the need to ensure public funds are expended on improvements that have significant value in holding down casualty risk. FRA has also been conscious of the fact that there may be, at least in the short term, an opportunity cost associated with the decision to spend scarce tax dollars on SSMs in order to maintain community quiet, rather than other uses. (In acknowledging this point, FRA notes that this is ***not*** a zero sum exercise because the avoidance of accident consequences is an economic benefit to the community.)

FRA recognizes that there is no way to achieve what would be perceived as perfect justice for communities in this proceeding, any more than it is possible to eliminate all risk to persons. However, FRA has concluded that the risk assessment method selected for this proceeding should:

- Permit exceptions to use of the train horn based on absence of significant risk, in most cases avoiding expenditures that would not be recovered through accident and casualty reduction;

- Require use of the train horn where risk is clearly significant, unless SSMs and ASMs are implemented to abate the excess risk associated with silencing the train horn; and
- Respond to changes in rail operations and communities as data becomes available to update the relevant computations.

The particular means chosen by FRA to identify significant risk is the creation of a risk index by which prospective quiet zones can be rated in relation to one another and in relation to selected criteria. The method (which is more fully explained below) is applicable to quiet zones created both where there are existing bans and elsewhere. In considering how to approach this problem, FRA elected to start with the current Accident Prediction Formula (APF), which uses data elements available from the national inventory of highway-rail crossings and the FRA Railroad Accident-Incident Reporting System. The APF was developed by the Volpe National Transportation Systems Center for FRA and the Federal Highway Administration, and it is maintained in current form to support initial identification of crossings that are candidates for safety improvements using Federal funds. Many States use this formula or similar formulas to rank crossings for this purpose.

The strength of the formula is in its ability to combine empirically derived insights about risk, based on common characteristics of crossings and the accident history of the individual crossings under study. As such, it is reasonably successful in predicting where accidents will occur. As with any model of this type designed to study relatively rare events, the model is more successful in predicting results for a group of crossings with at least some similar characteristics (e.g., several crossings in a proposed quiet zone) than for a single crossing.

Risk is defined as the product of probability (frequency) and severity (consequences), so the APF prediction of the likely number of accidents by itself is not enough. However, the suite of APF tools includes calculations that permit estimations of the likelihood that a predicted accident will result in injury or death to one or more persons. FRA has taken advantage of these tools to estimate the likely frequency of relevant (casualty-producing) collisions. To determine the likely number of injuries and fatalities in predicted accidents, FRA has employed the averages from historical accidents. In order to combine the consequences of non-fatal and fatal injury, FRA has used relational values derived from cost-benefit practice (in which the avoidance of a fatality is assigned a societal value based on established government guidelines, and both less serious and more serious non-fatal casualties are then assigned a value proportional to the value of avoiding a fatality). The result is a risk index value for each crossing.

From the inception of this rulemaking (indeed, beginning with the issuance of Emergency Order 15 in 1991), FRA has sought to address the issue of quiet zones (contiguous rail corridors of reasonable length having one or more crossings) rather than individual crossings. FRA has noted that a crossing-by-crossing approach would not serve community interests, given the distance over which the horn must be sounded and given the proximity of crossings in most communities. Corridor planning permits risk reduction to be taken at the lowest possible cost, and it encourages consolidation of crossings through closure of redundant or very hazardous crossings. Further, locomotive engineers have increasingly demanding jobs and should not be distracted by the task of picking out individual crossings along their route where the horn must or must not be used. There were no comments in this proceeding that effectively questioned this rationale, and there was substantial support for it.

As a result, FRA has adhered to the corridor approach in this interim final rule, so use of the risk index is specified to be at the corridor (quiet zone) level. The basic logic of the method is as follows:

- Estimate the probability of injuries or fatalities at each crossing using the APF formulas;
- Aggregate the risk from all crossings in the proposed quiet zone; and
- Divide the risk by the number of crossings,
- Yielding a risk estimate for the proposed quiet zone.

This approach must be adjusted if the proposed quiet zone was not subject to an historical whistle ban, since the effect of silencing the train horn would be to drive up risk. As more fully explained below, with limited exceptions the adjustments necessarily rely on national averages of train horn effectiveness.

This risk index approach permits an objective comparison of the situations in various communities, taking into account the actual accident experience to date. FRA is aware that there are limitations to the method. For instance, (i) the APF does not take into consideration every possible factor relevant to risk, (ii) data driving the predictions is largely from the great majority of crossings where the horn is used, (iii) a significant component of risk inherent in the formula outputs is not as relevant to evaluation of train horn risk (i.e., pedestrian casualties), and (iv) adjustments to the index based on excess risk associated with silencing the horn will understate risk in some cases and overstate risk in other cases. However, FRA is not aware of a more useful methodology for evaluating comparative risks at grade crossings, and none of the limitations appears to substantially vitiate its value for this purpose.

In examining options for this interim final rule, FRA applied this methodology to known whistle ban crossings, grouping them by railroad and political jurisdiction pairs, with some segmentation to recognize that more than one rail line was present or that operational characteristics of the railroad changed markedly (e.g., at a junction). As reported in more detail below, the results show that there are material differences in corridor risk among the existing whistle ban jurisdictions (on an average per-crossing basis).

FRA then performed the same calculation for all train horn crossings in the nation that are equipped with flashing lights and gates and derived an average for those crossings, which is referred to in this rule as the Nationwide Significant Risk Threshold. This measure provides a statistical tipping point by which crossings nationwide can be compared to determine the significance of the risk present. FRA's rationale for selecting this threshold as a basis of comparison was that if certain proposed quiet zones pose less risk (even when adjusted for the absence of the train horn) than the average corridor where the train horn is sounded, then the risk of not sounding the train horn in those locations might reasonably be characterized as insignificant.

During the public comment cycle, FRA also heard repeatedly from existing whistle ban communities where, it was reported, there had been no accidents for many years (or none likely attributable to the absence of an audible warning). FRA recognized that, since highway-rail crossing accidents are rare events, the absence of accidents within a period of a few years might say little about underlying risk. At the same time, FRA was aware that some communities have made a real effort to stress law enforcement and public awareness; and it seemed desirable to provide some additional flexibility to communities that have not experienced a recent accident of the kind relevant to the circumstances addressed in this rulemaking. So FRA posited that it

should be reasonable to subject accident-free existing whistle ban jurisdictions to a test that might be a multiple of the Nationwide Significant Risk Threshold (NSRT). A multiple of two was selected for analysis.

In order to determine the implications of this methodology, including the two proposed thresholds, FRA applied the risk index method to existing whistle ban jurisdictions (WBJs) retrospectively. Employing accident data for 1990 through 1994 and grade crossing inventory information as of January 1, 1995, FRA categorized these WBJs by Crossing Corridor Risk Indices (CCRI) relative to the two thresholds: (1) CCRI less than NSRT, (2) CCRI greater than the NSRT with relevant collisions between 1990 and 1994, (3) CCRI between the product of one and two times the NSRT and no relevant collisions between 1990 and 1994, (4) CCRI greater than the product of two times the NSRT and no relevant collisions between 1990 and 1994. FRA posited that jurisdictions above the relevant thresholds (i.e., those above the Nationwide Significant Risk Threshold with relevant collisions in the preceding five years, or with no relevant collisions but above twice the Nationwide Significant Risk Threshold) would be required to make investments to abate risk, while those below would not. To simulate the safety impacts of this approach, FRA analyzed the effect based on an artificial rule issuance date of January 1, 1995, with an effective date of January 1, 1996. FRA then analyzed actual collision history for the crossings in each category for the period 1996 through 2000.

The results (reported in detail below and on the FRA web site) were then compared with the Nationwide Significant Risk Threshold and a value equal to two times the Nationwide Significant Risk Threshold (2xNSRT) (determined as of January 1, 1996) to evaluate the distribution of potential quiet zones derived from existing bans. FRA posited that jurisdictions above the relevant thresholds (i.e., those above the Nationwide Significant Risk Threshold with

relevant collisions in the preceding five years, or with no relevant collisions but above twice the Nationwide Significant Risk Threshold) would be required to make investments in SSMs or ASMs in order to abate excess risk, while those below the thresholds would not.

The analysis effectively validated the risk assessment method, demonstrating that for the subject period it would have focused public resources on whistle ban corridors where the investments would have been well spent (with resulting reductions in injuries and fatalities). It showed that in the five-year period that would have followed implementation of the rule, as of January 1, 1996, 69 percent of the casualties resulting from the relevant collisions that occurred at whistle ban crossings would have occurred in quiet zones that initially would have had to make safety improvements to retain the whistle bans (see table below). Those safety improvements would have substantially mitigated the casualties at those crossings.

By the end of the five-year period, the communities where 24 collisions resulting in 16 casualties occurred would have had to implement safety measures to reduce their corridor crossing risk indexes to permissible levels in order retain their whistle bans. **By the end of this five-year period, only 32 percent of the relevant collisions and 21 percent of the casualties would have occurred in communities that would not have had to implement safety measures.**

Injuries resulting from collisions involving trains traveling at speeds of 25 mph or less are on average moderate compared to the critical nature of injuries that tend to result when train speeds are higher. **By the end of the five-year period, only seven percent of the more severe casualties would have occurred in communities that would not have had to implement safety measures.**

The following table presents the distribution of crossings, collisions, and resulting casualties. The first data column presents the number of crossings that would have fallen into each quiet zone category on January 1, 1995. The second data column presents the number of relevant collisions (those that FRA believes could have been by preventing by sounding the train horn) that occurred in the five-year period that would have followed implementation of the rule. The next two columns present the resulting casualties (fatalities and injuries combined).

As is more fully developed below, the CCRI refers to the Crossing Corridor Risk Index (the average risk for crossings in a potential quiet zone) and the NSRT refers to the Nationwide Significant Risk Threshold (which is the average risk at gated train horn crossings).

	January 1995	January 1, 1996 through December 31,2000		
	Crossings in WBJs	Relevant Collisions	Casualties	Casualties excluding injuries where max train speed < 25 mph
CCRI > NSRT with relevant collisions	865 (36%)	208 (59%)	109 (64%)	94 (78%)
CCRI > 2 * NSRT (no collisions 2000- 2005)	72 (3%)	10 (3%)	8 (5%)	8 (7%)
CCRI Between	236	24	16	10

NSRT & 2 * NSRT (no collisions 2000-2005)	(10%)	(7%)	(9%)	(8%)
CCRI < NSRT	1,242 (51%)	113 (32%)	36 (21%)	9 (7%)
Total	2,415 (100%)	355 (100%)	169 (100%)	121 (100%)

Therefore, FRA concluded that use of a methodology that compares the known risk in a current or prospective quiet zone to the average risk level at crossings across the nation where train horns are sounded (the Nationwide Significant Risk Threshold) provides a very rational basis for determining where silencing the train horn presents a significant risk. Moreover, FRA concluded that considering an existing whistle ban's actual accident history in that methodology (by making greater allowances for accident-free jurisdictions) provides an even better approximation of risk than does simple reliance on comparing the quiet zone's projected risk level with the Nationwide Significant Risk Threshold.

Subsequent to completion of this validation effort, FRA determined that a number of the crossings previously identified as being in no whistle status in the Chicago Region should, in fact, be removed from that list based on elections (largely by freight railroads) to sound the horn. FRA has not repeated this analysis with the smaller data set because (1) its purpose was to determine the usefulness of the method to sort corridors with greater risk from those with lesser risk and (2) whether train horns are sounded at the crossings in question is not critical to the

analysis (particularly since the counter measures involved are equally useful at both categories of crossings).

D. Alternatives Considered

FRA considered several other alternatives in determining how to craft exceptions to train horn use. In reviewing the comments on the NPRM and Draft Environmental Impact Statement, FRA identified five additional alternatives for determining where train horns must sound. All of these alternatives involve the same basic environmental effects and benefits of this interim final rule: wherever the train horn sounds, the noise impacts and safety benefits will be the same; wherever the train horn is silenced, the benefits in terms of noise reduction will be the same and the same safety risks will be presented unless compensated by the addition of gates and lights, SSMs, or ASMs. Upon examination, FRA concluded that these alternatives are not reasonable options given the agency's purpose and need for the action and dismissed them from further consideration. These alternatives are described below.

No Exceptions

This alternative would implement the non-discretionary command of the statute by requiring trains horns to be sounded at all public highway-rail grade crossings. This would be what the statute would require if FRA were unable to devise a workable means of providing for quiet zones that satisfies the statute. FRA would set a maximum sound level for locomotive horns. Changes from the NPRM provisions related to the actual sounding of the horn and maximum sound levels could be accommodated within this option.

Advantages: This option has the advantage of simplicity. It would result in a high level of safety at highway-rail crossings, and the costs of administration would be negligible.

Disadvantages: This approach is not responsive to the statutory command to consider the interests of communities with existing train horn bans because FRA can devise a regulatory regime permitting communities to reduce noise by substituting other safety measures for the sounding of train horns and this option fails to address the issue. Aside from the statutory command, providing a means for communities to quiet train horns has been urged on FRA by the great majority of commenters and their elected representatives (including many who supported the proposed rule as a good means of achieving community quiet and safety). It is simply untenable to say that the final rule should provide no alternative to a high noise load for communities on rail lines with high train counts. Taking this course would also create unnecessary conflict between commuter rail service and the communities served, potentially compromising this important element of a balanced transportation system in many major metropolitan areas.

Had this alternative not been eliminated on statutory grounds, the environmental effects of this alternative would not require separate analysis. Analysis of the effects of the no action alternative shows the effect of sounding train horns at highway-rail grade crossings across the Nation and the effects of permitting the continuation of existing train horn bans. This alternative would differ only in the elimination of the existing train horn bans, resulting in the known effects of sounding the train horn in those locations as well, including the known safety benefits flowing from sounding the train horn.

Make The NPRM Final

The Notice of Proposed Rulemaking required trains horns to be sounded at all public grade crossings; set a maximum sound level for locomotive horns; and provided an opportunity for any community to establish a quiet zone where all public grade crossings are equipped with

gates and lights and data and analysis show that implementation will reduce risk in the quiet zone to sufficiently compensate for the absence of the horn sounding: by implementing one or more Supplementary Safety Measures (SSM) at each crossing (does not require FRA approval); or by implementing a combination of SSMs or Alternative Safety measures (ASM) at some or all crossings within a proposed quiet zone with FRA approval. Communities with present whistle bans would have up to three years in which to implement SSMs and ASMs. Crossings with track speeds of 15 mph or less at which people bearing flags warn motorists of the passage of a train would not need SSMs.

Advantages: Pursuing this option would serve the interest of safety and community quiet. It would be less complex than the option selected.

Disadvantages: FRA found this option to be unacceptable because it insufficiently tailored the rule's burdens according to risk and would be unresponsive to hundreds of commenters who strongly urged improvements in the rule before its adoption. Many of those commenters live in or represent communities where the train horn is not now sounded, so being unresponsive to them would arguably be unresponsive to the statutory direction to take into account the interest of those communities. FRA agrees with those commenters that the proposed rule offered insufficient time for implementation and would have made the situation particularly difficult for public authorities and railroads in regions where impacts would be most substantial. FRA agrees with the tenor of many comments that the proposed rule would have required compensation for loss of the train horn even where risk is very low (or would be projected to be low even after the horn was silenced). The result of maintaining that requirement would have been poor cost-benefit tradeoffs for many communities. Staying with the literal text of the NPRM would also

have missed opportunities for refinement of SSMs/ASMs and would not have captured noise reductions associated with the shift from distance- to time-based horn use.

The environmental effects of the NPRM were analyzed thoroughly in the DEIS and taken into account by the FRA in framing the proposed action represented by the interim final rule, which is a logical outgrowth of the NPRM.

Grandfather All Whistle Bans Existing As Of 10/9/96

This alternative would allow communities that had whistle bans in effect on October 9, 1996 to retain those bans as long as the level of risk does not increase. Risk would be calculated using the APF for the entire whistle ban corridor. FRA would essentially be accepting the level of risk the community itself has determined to be acceptable - and would hold the community to that same level of risk. If a whistle ban community exceeded its risk threshold, it would have three years to implement changes (e.g. install SSMs) sufficient to reduce risk to below its risk threshold. Changes related to use of train horns, including the maximum sound level, could be accommodated within this option.

Advantages: This approach would have avoided conflict with current whistle ban communities and, in theory, might have capped the negative safety impacts of bans. As under the proposed rule, New Quiet Zones would be instituted without any loss of safety.

Disadvantages: This option was rejected for the following reasons, any one of which is independently sufficient: It is unresponsive to the purpose of the statute to the extent excess risk associated with existing bans would be allowed to continue unabated; it does not directly take into account predicted accident severity, and therefore does not truly consider risk (frequency times severity); the Administrator could not have made the statutorily required determination that these exceptions would not present a significant risk with respect to loss of life or serious

personal injury; it would not provide a uniform level of safety across the Nation; it did not afford New Quiet Zones the same exceptions allowed for Pre-Rule Quiet Zones, thus undermining uniformity of application and requiring local authorities to expend funds on improvements for which the safety pay-back could not be reasonably assured at the system level; it would permit communities with bans to transfer costs to the society at large through insurance, public health and welfare programs, and court judgments; and administration of the approach is not technically feasible. FRA noted that factors other than silencing the train horn would typically be responsible for the growth in calculated risk in the subject communities (e.g., increase in motor vehicle traffic as a result of residential or commercial development in an adjoining jurisdiction; growth in rail traffic). It did not seem sensible to permit excess risk to continue, provided nothing changes in a community, while requiring new increments of risk in other communities to be addressed without regard to whether the current level of risk is excessive (i.e., FRA realized that this option did not address the right question).

The environmental effects of this option were not analyzed further because this was not a reasonable option to pursue.

Grandfather All Whistle Bans Existing As Of 10/9/96 B Combine Collision-Free Exemption With Severity-Weighted Single Threshold

This very complex option was a precursor to the path taken in the interim final rule. It took a much different approach to Pre-Rule and New Quiet Zones. It would allow communities with whistle bans in effect on October 9, 1996 to retain those for the first 5 years following publication of the interim final rule. Thereafter such communities could retain bans as long as: there have been no collisions within the past 5 calendar years or risk has not increased above a pre-established threshold calculated using the APF for the past 5 years; *and* at least flashing

lights and gates have been provided at all such crossings. The option included a severity element in the risk computation for the threshold. A corridor risk index and national threshold would be used, as in the interim final rule. The option provided further flexibility for retaining whistle bans during the transition period as follows: a State Department of Transportation (or other authorized state-level body) could request extended implementation beyond the 5-year period on the basis that the State is assisting local jurisdictions in implementing quiet zones and requires additional time due to funding and/or administrative constraints. The following would apply: each project must be the subject of a filing with FRA (i.e., the rule otherwise applies as revised); actual implementation of initial projects will begin not later than year four; consistent with efficient completion of required work and corridor-related safety considerations, improvements will be implemented at the most hazardous crossings first (where risk reduction opportunities are greatest) and then proceed to less hazardous crossings; no less than 25% of identified excess risk must be abated by the end of year five, 50% by the end of year six, 75% by the end of year seven, and 100% by the end of year eight; and this relief will expire eight years following publication of the interim final rule (seven years from the effective date). If a community exceeded the severity threshold in any annual review thereafter, actions would be taken as necessary to fall back below the threshold within a three-year period or the train horn would be required to sound; or actions sufficient to compensate for the loss of the train horn would have to be taken. Communities establishing New Quiet Zones would be required to follow the standards set forth in the NPRM (and would not be able to take advantage of low baseline risk, even after adjustment for loss of the train horn).

Advantages: This option would take into consideration the interests of communities with existing bans in a manner similar to interim final rule, except flashing lights and gates would be required

where not present. It would set a requirement of flashing lights and gates for all crossings where the train horn is silenced, enhancing safety. It would also avoid any negative flow of safety benefits related to toleration of new unabated risk in New Quiet Zones.

Disadvantages: FRA rejected this option principally because it did not afford New Quiet Zones the same exceptions allowed for Pre-Rule Quiet Zones, thus undermining uniformity of application and requiring local authorities to expend funds on improvements for which the safety pay-back could not be reasonably assured at the system level. Further, FRA noted that the costs of flashing lights and gates in existing ban areas would be substantial, in some cases potentially resulting in loss of quiet zone status (with resulting disruption of settled expectations) due to financial inability of communities. Again, in many cases costs might not be fully recovered through safety benefits. FRA also discarded the rigid implementation schedule for Pre-Rule Quiet Zones on the ground it could not be effectively policed in an environment where local authorities would find it necessary to move to a large extent on their own schedules (albeit in some cases with State assistance). FRA also concluded that excepting Pre-Rule Quiet Zones from the requirement to make safety improvements solely on the basis of no accident history (with necessarily limited exposure) could not be supported as based on sound safety analysis (and opted, instead, for a limited exception based on both accident history and underlying estimated risk).

This option was rejected as unreasonable and its environmental effects would be very similar to the proposed action.

Require Horns Or SSMs At Highest Risk Crossings Within Each State

This alternative would have required that train horns be sounded at all grade crossings except those where (1) maximum train speed is 15 mph or less and flaggers are provided or (2) a

whistle ban permitted under the rule is in effect. Existing whistle bans could continue provided high risk crossings are addressed within three years. New whistle bans could be created only if crossings within them were equipped with gates and lights. No whistle ban could include a grade crossing categorized as high risk, except crossings within existing whistle bans that are remedied within three years. High risk crossings are those with an APF greater than or equal to .05 (i.e., a five percent chance of an accident occurring at that crossing in the next 12 months). Where train horns are now sounded, the crossing's APF would be increased by 44 percent to account for the absence of the train horn. Within one year of the rule's issuance, any community with an existing whistle ban would have to certify that it has reviewed FRA data on effectiveness of horns, whistle ban effects, and relative merits of SSMs and consulted with affected railroads and state officials about possible safety improvements. Any community imposing a new whistle ban must first provide the same certification. Communities with existing whistle bans may continue to include crossings lacking gates and lights unless and until the crossing has an APF of .05 or more. Once a whistle ban is in effect, any crossing that reaches an APF of .05 must be remedied within two years.

Advantages: This option was viewed as attractive because it would have mandated safety improvements at very high risk crossings within a relatively short time and provided categorical relief for crossings deemed relatively low risk. It defined risk uniformly for all crossings and all jurisdictions. It is relatively simple. It defined significant risk very clearly: equal to or greater than one predicted collision every 20 years. It captured a high percentage of predicted casualties, i.e., it would have addressed a high proportion of the risk presented by whistle bans.

Disadvantages: This option was rejected because: it does not directly take into account predicted accident severity, and therefore does not truly consider risk (frequency times severity); it does

not permit sufficient flexibility to reduce risk within a quiet zone by dealing with crossings other than ones with the highest APF values and, therefore, does not adequately take into account the interest of communities with existing whistle bans; and it is not in harmony with the corridor improvement concept underlying the proposed rule. The statute addresses all crossings, not merely the most hazardous. The option focuses more on absolute risk rather than compensation for loss of the train horn (the focus of the law). A crossing-by-crossing approach to horn use would abandon the corridor approach to crossing safety improvements advocated by the US DOT for many years (including eliminating the incentive for consolidation of redundant crossings), and it could result in very uneven results in terms of community quiet, depending on local implementation. The option could result in a patchwork of ban areas, adding to burden on locomotive engineers to pick out, crossing by crossing, where the horn must be sounded. This option could be more costly per unit of risk reduced because the community is required to take risk reduction at specified crossings rather than where means and need best correspond (e.g., foreclosing the option of putting in medians at two moderate-risk crossings for a total cost of \$40,000 rather than installing four-quadrant gates at one higher risk crossing for an incremental cost of \$75,000-\$150,000, even though the resulting risk reduction is the same).

This alternative was not considered reasonable. If the environmental effects of this option were to be considered, the noise impact of sounding a train horn at a crossing would be the same as it would be for the preferred option and the safety benefits of sounding the train horn or fully compensating for the absence of the train horn would be the same as for the preferred option.

After considering all of these alternatives, FRA settled on the risk-based methodology adopted in this interim final rule. FRA believes this methodology best embodies Congress'

intent, i.e., to permit exceptions to the use of the train horn only where doing so demonstrably does not present a significant risk, or where the significant risk has been compensated for by other means.

E. Implementing the Interim Final Rule

FRA is aware that this interim final rule has the disadvantage of some degree of complexity. Designing corridor improvements that meet community needs and the criteria set forth in this rule will be hard work. In this case, FRA has sought to provide some relief from the burdens perceived in the NPRM by marrying a conceptually simple notion (the probability that a vehicle occupant will be injured or killed) with a risk assessment method that is fully accessible only to those with some statistical skills who work hard to understand it. Maintaining a current inventory of affected crossings will also require significant attention to detail.

In taking this course, however, FRA has also recognized its obligation to prepare user-friendly tools for use by local planners. These tools are now available for beta testing on FRA's web site, and FRA has also provided the results of the preliminary calculations for communities with existing bans based on existing inventory data (as well as the assumption that the community will elect to include all crossings in a New Quiet Zone).

In FRA's experience, State and local government personnel such as city managers and county engineers are extremely capable professionals who are very unlikely to be daunted by the preparations required under this rule. Further, FRA crossing safety managers in each of FRA's eight regions will be available to work with communities and walk them through the necessary analysis, as well as participate in diagnostic teams established by State and local governments to evaluate options for safety improvements where they are required. No community will have to go it alone, because FRA will provide technical assistance.

Finally, FRA has provided a substantial extension of time for communities with existing whistle bans to convert their corridors into quiet zones without intervening disruption caused by the train horn. In response to the statute's direction to A take into account the interest of communities with existing bans, the proposed rule would have allowed a maximum of three years from issuance for implementation, with the third year available to communities that had implemented some form of education or enforcement program. This interim final rule, by contrast, allows five years from its publication (four years from the effective date of the requirement to use the train horn) for implementation by individual communities. Communities had complained that the requirements of State and local budget cycles required more time for planning and securing funding. Further, it was noted that engineering improvements may require substantial lead time and that railroads may have limited staffing in relation to a compressed schedule for installing new warning systems in a number of communities on their lines. FRA agrees that an extended schedule is warranted.

Further, FRA has recognized that some States (notably Illinois and Wisconsin) have large numbers of whistle bans and that some exist in communities of concern with respect to environmental justice. In situations such as this, it may be imperative for some Federal funds to be allocated by sources for which engineering improvements are eligible (e.g., the Surface Transportation Program and the National Highway System program). These allocations would be made by the State departments of transportation based on plans developed through the metropolitan planning organizations, a process that can require several years. Because of competition for uses of these funds, a State may not be able to allocate Federal funds for these purposes in a single fiscal period. Similar considerations would presumably apply to distribution of any funds made available from State sources. Accordingly, in order to create an incentive for

State participation in meeting these needs (through allocation of Federal or State funds), FRA has allowed a full eight years for communities with existing whistle bans to complete quiet zone improvements if (I) the State steps forward with a plan to provide assistance, and (ii) actual improvements in at least one community within the State are effected before the end of the fourth year.

FRA is acutely aware that this extended implementation cycle could be subject to abuse. Accordingly, FRA has included in the rule procedures to ensure that good faith progress is made toward completion of improvements that communities promise to undertake. Where that does not occur, FRA will notify the railroad to sound the train horn, as the rule requires.

F. Existing Bans and New Quiet Zones

FRA has endeavored to fashion a final rule that establishes as much parity as possible between communities with existing whistle bans and those that wish to establish them in the future, while recognizing legitimate differences. The rule puts both types of communities on the same footing, as follows:

- The rule starts from the premise that after a time certain the train horn will sound unless an appropriate exception is satisfied, regardless of prior practice.
- Both the haves and the have nots may establish quiet zones by implementing SSMs and ASMs sufficient to compensate for loss of the train horn; and both may take their risk reduction at the corridor level, normally without making improvements at every crossing.
- The rule allows establishment of quiet zones even without SSMs and ASMs if--

(I) in the case of an existing whistle ban corridor, risk is shown to be at, or below the Nationwide Significant Risk Threshold or be below twice that level and the corridor has had no relevant collisions during the preceding five years; or

(ii) in the case of a New Quiet Zone, risk (after adjustment to account for silencing the train horn) is shown to be at or below the Nationwide Significant Risk Threshold.

- If a community avoids expenditures related to creation of a quiet zone because it falls below the Nationwide Significant Risk Threshold and risk increases to above the threshold, the community is required to compensate for that increase in risk within a period of three years, or the railroad will be required to sound the train horn.
- All communities are subject to the same filing and inventory maintenance requirements.

Some differences in approach to existing whistle ban jurisdictions and New Quiet Zones have been necessary, as well. We have already said that existing whistle ban jurisdictions are different, as a practical matter, because public and private planners (e.g., zoning officials, citizens purchasing residences, businesses locating shops) have made choices in reliance on the belief that the train horns will not sound. The statute enjoins us to take their interests into consideration, and the grace periods provided under the rule (five and eight years) maintain community quiet well ahead of community actions that would otherwise warrant that result.

The fact that existing whistle ban jurisdictions have known accident records under circumstances where the horn is not sounded also permits some additional latitude. FRA has noted significant variation in the outcomes where whistle bans have been enacted or observed.

Although some of this variation is the result of limited exposure to rare events, some of it likely reflects the existence of circumstances that are different in the communities (nighttime vs. 24-hour bans, strong or weak law enforcement, generally good sight lines or poor ones, etc.). Over time, the presence or absence of such factors will be revealed in the accident rate. An important feature of the interim final rule creates an exception for existing whistle ban communities with no recent horn-relevant accidents but with risk levels that are above the Nationwide Significant Risk Threshold but below a value equal to two times that threshold. This exception remains until the community experiences a horn-relevant accident, after which it is judged by the same standards as other communities (with a 3-year grace period if it elects to adopt SSMs or ASMs).

The issue of whether flashing lights and gates should be required as a baseline condition for a quiet zone has similar characteristics. In the NPRM, FRA specified that all crossings in any quiet zone should have flashing lights and gates based on the following practical considerations:

- At passively signed crossings, the motorist is expected to yield to oncoming trains. But the only warning of a train's approach is provided by the train itself, including the headlight and auxiliary alerting lights, and the train horn (if used).
- Because of obstacles in the sight triangle, track curvature, angle of intersection, or adverse weather, there are some circumstances where only the horn may be effective in aiding the motorist's decision.
- It is unfair to place a burden on the motorist to yield without providing the best available information to inform the decision.
- Crossings equipped with flashing lights but no gates are similarly situated, except that the motorist is expected to stop but under most State laws may proceed if safe

to do so. In many cases motorists are left with ambiguous information regarding the appropriate response.

Accordingly, FRA continues to be convinced that, with respect to quiet zones where the train horn is silenced for the first time, flashing lights and gates should be provided at all public crossings. Motorists using such crossings will for the first time be deprived of auditory warnings, which would place them at significant peril if no additional warnings are provided.

However, FRA recognizes that a significant number of whistle ban crossings exist today, particularly in the State of Wisconsin, where only passive signage or only flashing lights are provided. There is now risk data specific to those situations. Further, the statute asks us to give special consideration to the needs of communities where these crossings are located, and public and private planners have made decisions in reliance on the status quo. Finally, FRA will have achieved the principal safety objective of this rulemaking if significant risk to persons associated with the absence of the train horn has been abated.

Accordingly, FRA has determined that it is appropriate to allow conversion of existing whistle ban corridors into Pre-Rule Quiet Zones without requiring that flashing lights and gates be provided at all crossings. FRA has further provided that, where the proposed Pre-Rule Quiet Zone exceeds the relevant risk threshold (making it necessary to compensate for absence of the train horn), the community may credit the risk reduction associated with installation of flashing lights and gates toward the required effort. In many cases this will not result in all crossings being so equipped, but it will encourage use of the most important single safety improvement available in the highway-rail crossing toolbox.

G. Requirements for the Train Horn and Its Use

On the effective date of that portion of this rule, which mandates use of the train horn, State laws concerning use of the train, horn at highway-rail crossings will be preempted. This rule will also require the modification of railroad operating rules that are in conflict with it. FRA already has in place a rule that sets a minimum horn loudness of 96 dB(A) at 100 feet in front of the train. The method for conducting that test, a possible maximum level for the horn, and the manner in which the horn is sounded have been issues in this rulemaking. In approaching this complex of issues FRA has tried to balance several considerations, specifically--

- The need to make it possible for motorists to be warned within their vehicles, with windows closed, at a point on their approach to the crossing where the information is useful; and
- The need to limit dispersal of horn noise into the community (other than at the crossing and its approaches) to the extent feasible.

Although FRA can foresee the possibility of further refinements in these decisions over the next few years as information becomes available, the comments received in this rulemaking, coupled with further research conducted in response to those comments, have provided a good foundation for resolving these issues.

The first group of issues has to do with the horn itself. FRA had hoped to describe engineering characteristics of the horn that would mitigate the dispersal of noise into the community (in railroad parlance, to the field). This issue has been presented primarily due to the relocation of horns to the center of the locomotive roof, a choice made by railroads to reduce crew occupational noise exposure. At FRA's technical conference on acoustical issues, the major railroads arranged a presentation by a recognized expert who described a shadow effect

produced by the locomotive profile that results in misleadingly low sound level readings at the location specified in FRA's current test procedure. The point of calling attention to this was to emphasize that in terms of actual dispersal of noise the noise levels to the field do not, in fact, exceed those to the front (as might be suggested by readings taken just 100 feet directly in front of the locomotive at only four feet above the track). The overall lesson FRA was asked to take from the presentation is that while center-mounted horns are *not* louder to the field than to the front, neither can they be made highly directional.

A secondary lesson from this presentation and a subsequent field study is that, by testing the horn at roof height (which under the noise models actually is more proportional to the noise received at the crossing), it may be possible to turn down some roof mounted horns. As a result, FRA adopts a new test procedure in this interim final rule that retains the 100-foot distance but places the sound level meter receptor at roof height (i.e., out of the locomotive's shadow).

Another objective of this rulemaking has been to set a maximum sound level for the horn. The NPRM proposed consideration of two values 104 dB(A) (which was seen as more appropriate for actively signed crossings) and 111 dB(A) (which was viewed as more appropriate for passively signed crossings). Although FRA's general rationale was reasonably well received by some commenters, many others appeared convinced that train horns are too loud and should be significantly reduced in volume. FRA has continued to evaluate the issues identified in research referred to in the NPRM, including refined analysis using signal detection theory, and is persuaded that a maximum value of 110 dB(A) should be sufficient to alert motorists in most situations, including a small margin of error associated with test instrumentation and setup. Accordingly, the interim final rule requires that railroads progressively test their locomotives and reduce the air pressure (or alter the aperture) on all horns to produce a maximum volume of no

more than 110 dB(A) as measured 100 feet in front of the locomotive at roof height. FRA expects that most freight railroads and Amtrak, whose locomotives operate over a variety of highway-rail crossings across the Nation, will set their horns near the maximum allowed to provide effective warning at passively signed crossings. FRA expects that commuter authorities, which operate primarily over crossings with flashing lights and gates, may set horns in the lower portion of the allowed range. This overall process, by enforcing a maximum below the known sound level of some center-mounted horns, may modestly reduce noise in some communities.

It should be noted that FRA did not find it possible to do as the NTSB suggested in its comments to the docket, which was to select a sound level that will maximize safety at all highway-rail grade crossings. To reach every driver with the horn (including each driver with a stereo turned up to maximum volume under all conditions of traffic conditions, pavement surface, weather, etc.) would require a volume so great that the effects on communities and crew members would be clearly unacceptable. However, in selecting the maximum level FRA has taken into consideration the NTSB's findings from its study of passive crossings. Further, FRA has completed additional work on sound detectability that suggests more favorable results at actively signed crossings where the driver has a heightened awareness of the possible presence of a train and where a very high signal-to-noise value should not be required. Dissemination of NTSB and FRA studies should put railroads in a favorable posture to determine horn loudness appropriate to their operating conditions, achieving the lion's share of the potential risk reduction.³ Further, our heightened understanding of the limitations of the train horn should help

³The NTSB's Passive Crossing Study has been construed by some as an attack on the safety value of the train horn because it cited examples of situations at passively signed crossing in which the horn's signal-to-noise ratio likely did not meet a pre-established criterion. Neither the NTSB's report nor its comments in this docket question whether the horn is effective in

clarify the need to implement of active warning systems where they are not already provided as funding becomes available.

The final issue concerns the manner in which the horn is sounded. The actual pattern of two long, a short and a long is well established, and FRA finds no reason to alter it. It is necessary to sustain the warning provided by the horn through a period of 15 to 20 seconds prior to arrival of the train at the crossing in order to reach motorists situated at various points on the roadway under varying angles of intersection and differing vehicle and train speeds. It is not possible to just give a toot, as suggested by some, and still provide the unmistakable and persuasive warning needed to deter risky motorist behavior.

FRA did note in the NPRM, however, that the traditional practice of requiring that the horn be sounded approximately one-quarter mile before the crossing is excessive when train speeds are well under about 45 miles per hour. Accordingly, FRA proposed that it might be possible to use a time- rather than distance-based criterion. Representatives of the Brotherhood of Locomotive Engineers (BLE) seized upon this suggestion in their testimony, affirming that this could be accomplished. Accordingly, the interim final rule requires that the horn must begin to be sounded between 15 and 20 seconds prior to the arrival of the train on the crossing and while the lead locomotive is moving over the crossing, but for a distance no greater than one-quarter mile (1,320 feet). This time-based approach should reduce unwanted noise without compromising the usefulness of the warning provided. Sounding the horn over a distance greater than one-quarter mile would add no value, since the loss of volume associated with the distance preventing some accidents. Rather, the NTSB has ventured the conclusion that certain accidents have occurred at passively signed crossings where the horn did not provide a sufficient warning given the background noise and other factors. FRA's position in this rulemaking is consistent with this conclusion.

involved would almost certainly prevent any effective warning. FRA expects that railroads will leave existing whistle boards in place to assist engineers in estimating where to begin sounding the horn, given the speed of the train approaching the particular crossing.

H. Post-NPRM Ban Impact Studies

Following publication of the NPRM, various commenters indicated they had more accurate data and information regarding which crossings are subject to whistle bans. The Wisconsin Rail Commissioner, the Maine DOT, and the City of Chicago DOT provided a sufficient amount of new data with respect to affected crossings to warrant a revision to the FRA Updated Analysis of Train Whistle Bans (January 2000). Chicago area commenters (Hafeez and Laffey) also performed an independent study of the effects of whistle bans in the Chicago Region and concluded that whistle bans do not affect accident frequency in the Chicago Region. Commenters from Wisconsin indicated that there were a significant number of whistle ban crossings in Wisconsin that did not have active warning devices but had good safety records.

FRA therefore contracted with Westat, Inc., a nationally respected statistical research firm. The purpose of the Westat Inc., contract was to: (1) revise the 2000 FRA analysis of whistle bans to reflect the more accurate data received post publication of the NPRM, (2) obtain independent, expert review regarding FRA's methodology, and if necessary, recommendations as to ways to improve it; and (3) evaluate the points raised by representatives from the Chicago Region and the State of Wisconsin by performing regional studies of the effects of whistle bans in the two areas.

Westat - 2002

In the initial effort, Westat, Inc., utilized the same study period as FRA's update (1992-1996) (Zador, Paul L., April 1, 2002). The methodology employed was a refinement on FRA's

stratified method comparing accident histories of crossings with similar predicted risk. Westat concluded that on a nationwide basis (excluding Florida), adverse whistle ban effects were statistically significant at levels well below the conventional significance level of 5%, regardless of warning device class. All three classifications of warning devices experienced a higher accident rate in whistle ban areas as follows (National data excluding Florida only and excluding Florida and the Chicago Region):

Warning Device Class	Percent Difference	
	(with Chicago)	(excluding Chicago)
Passive	52.6	64.2
Flashing Lights	43.2	69.1
Gates	44.4	57.6

FRA had asked Westat to attempt regional analysis where the crossings appeared to be sufficiently numerous to permit at least some comparisons (i.e., Wisconsin and the Chicago Region). Data for Wisconsin generally indicated an increase in accident risk for each type of warning device with bans in place, whether the Wisconsin whistle ban crossings were compared with other similar Wisconsin crossings or with similar crossings nationally. Westat found, that in Wisconsin, due to the relatively small sample sizes, estimates for ban effects were not statistically significant at the conventional 5% level, with one exception. The accident rate for passively marked whistle ban crossings in Wisconsin was 84% higher than for passively marked crossings nationwide (excluding Florida and the Chicago Region) where train horns were sounded. This result was statistically significant. However, model fit was determined to be poor.

In reviewing the data for the Chicago Region, Westat found several unexpected results. Comparisons of Chicago train horn and whistle ban⁴ crossings within Chicago indicated higher accident rates at crossings where the train horn was used, but the data did not fit the model well (with the upper confidence limits for two of warning types well into the positive range).

When Chicago Region whistle ban crossings were compared with similar crossings in the Nation where train horns sound, results for passive and flashing lights categories again showed lower accident rates at ban crossings; however, estimates for the effects of no-whistle policies were not statistically significant at the conventional 5% level. The accident rate for gated whistle ban crossings in the Chicago Region was 34% higher than for gated crossings nationwide (excluding Florida and the Chicago Region) where train horns are sounded, and this result was statistically significant.

With respect to the gated crossing estimate for Chicago, Westat stated that the weight of this evidence was weakened by the fact that the model did not fit the data well. Specifically, in the Shapiro-Wilks test for normality of deviance residuals, the normal hypothesis was rejected for gates based on comparisons with the Continental U.S., Florida and Chicago Region Excluded.

Westat B 2003 (Final Study)

FRA found the results of the 2002 Westat study appeared to reinforce inferences FRA was deriving from other information related to the Chicago picture that may explain the Chicago data. In particular, FRA had noted that significant discretionary selection had occurred in the Chicago Region with respect to the crossings at which no whistle policies would be

⁴As noted below, this is really a misnomer. There are no train horn bans in the Chicago Region, only exemptions that railroads may utilize if they wish.

implemented. That is, horns were being silenced primarily at crossings that were inherently safer than others. Further, FRA noted that a growing body of information supported the conclusion that several hundred crossings initially believed to be impacted by a no-whistle policy either had never been in that status or had not been for several years. (How this occurred is more fully discussed under Chicago Region' below.) Accordingly, FRA commissioned Westat to do further work, resulting in the final study on the impact of train horn bans (Zador, Paul H., June 2003). The design for this study differed in three important respects from the earlier work:

The set of Chicago Region no whistle crossings was corrected to a much lower number based upon docket filings from the Illinois Commerce Commission, the AAR and Metra.

2. The study period was brought forward to address the most recent complete accident data contemporaneous with known crossing status (1997-2001).
3. Rather than simply employing the previous FRA method with refinements, Westat was asked to apply whatever statistical techniques it thought appropriate to derive the most valid results.

FRA received the Westat final report in May of 2003. In an attempt to determine the most meaningful explanation of the data, Westat applied four distinct statistical methods, with certain variations within the methods:

- The first method divided the crossings into two groups: one group with whistle bans and the other without. FRA's basic Accident Prediction Formula (APF) was applied to each crossing and then each group was sorted by the results of the APF. Then each group was stratified into ten categories with each stratum having the same accident count for the 1997-2001-study period. Finally, using both Poisson and Poisson-Normal regressions,

the two groups were compared and the effect of the whistle ban was estimated.

- The second method is the same as the first except six strata were used instead of ten.
- The third method did not divide the data into two groups and stratify them. Instead, a Poisson regression analysis was applied to the entire data set. The regression included all the variables used by the APF plus others including a 1/0 flag for whistle bans. The regression coefficient for the whistle ban was used to estimate the effect.
- For the fourth method, a Poisson regression analysis was applied to the entire data set in a manner similar to the third method except the 1/0 flag for whistle bans was not included. This regression yielded a revised version of the APF. Then, the crossings were divided into two groups (with and without whistle bans), and each group was divided into ten strata using the revised version of the APF. Finally, using Poisson-Normal regressions, the two groups were compared and the effect of the whistle ban was estimated.

On a nation-wide basis, the third method produced the most precise estimates for the effect of the whistle ban, so FRA has selected this method as the basis for its evaluation.

Once again, all three classifications of warning devices experienced a higher accident rate in whistle ban areas as follows (National data excluding Florida only and excluding Florida and the Chicago Region):

Warning Device Class	Percent Difference	
	(with Chicago)	(excluding Chicago)
Passive	71.6	74.9
Flashing Lights	21.7	30.9
Gates	43.4	66.8

The results for the Nation without Chicago provided the most reliable data. The results for passive and gated crossings were statistically significant well below the conventional 5% level. The model offered less confidence for crossings with flashing lights ($\text{Prob} > [t] = 0.08$), but the estimate is consistent with the results of FRA studies for the earlier period and represents the best information available regarding the effect of bans on the accident rate. Accordingly, FRA has employed the results for the Nation excluding Chicago as the national estimates of effectiveness for crafting this interim final rule.

The 2003 Westat report also attempted to derive results for the State of Wisconsin. Results differed substantially between intra-State and Wisconsin-to-national comparisons, even though all values showed a positive effect from the train horn and two of the three warning device categories had significant results in each of the analyses. FRA sees no basis for deviating from the national averages for the warning device categories without a better qualitative understanding of any underlying differences in risk profiles.

The Chicago Region results are briefly summarized here and then discussed in full context and at greater length below. The no-whistle crossing set provided to Westat included only 21 crossings with flashing lights and 21 passively signed crossings. As Westat noted, that is too few crossings from which to derive statistically meaningful results, and none were determined. FRA will apply the national estimates of ban-induced accident increases for passive crossings and flashers-only crossings to the Chicago Region.

Westat's calculations for the Chicago Region once again showed a negative effect from use of the train horn at gated crossings when only Chicago Region crossings were included in the analysis, but results were not statistically significant. For reasons more fully developed below, this result was expected, since railroads in the Chicago Region have been free to select which exemptions to observe and which to ignore.

However, Chicago gated no-whistle crossings experienced 17.3 percent more accidents when compared with the national gated crossings where the train horn sounded. This result was not statistically significant at the conventional 5% level, but it is more likely than not that the value is positive ($P > [t] = 0.312$). Comparing this result with the national data, Westat noted that the ban effect in the Chicago Region is significantly different from the ban effect in the rest of the nation. Taking note of this finding and other information discussed below, FRA will apply a 17.3 percent estimate of ban-induced excess risk to gated crossings in Chicago Region Pre-Rule Quiet Zones. FRA will apply the national average for gated crossings (Chicago excluded) to New Quiet Zones in the Chicago Region. The rationale for this decision is more fully developed below.

Ban Effects / Train Horn Effectiveness

Summary Table

Warning type 1/	Effect of ban (include. no-whistle policy) on accident frequency (percent increase) 2/	Reduction required from ban risk to retain Pre-Rule QZ (percent reduction and factor) 3/	Comment
Nation (Except Florida East Coast and Chicago Region)			
Passive	74.9	43 (.43)	
Flashers only	30.9	27 (.27)	
Flashers with gates	66.8	40 (.40)	
Chicago Region			
Passive	74.9	43 (.43)	From national avg.
Flashers only	30.9	27 (.27)	From national avg.
Flashers with gates	17.3	15 (.15)	Regional estimate
Florida East Coast Railway (FEC) 4/			
Flashers with gates	to be determined	not applicable	Regional estimate subject to review

Table Notes:

- 1/ These are the primary warning device types. FRA is aware that a variety of arrangements are in place at individual crossings and will provide guidance for association of the various arrangements with these benchmark values.
- 2/ This is the amount by which accident frequency has been estimated to increase when the horn is silenced.
- 3/ This is the reduction in collision frequency that must be achieved in order to restore crossings impacted by a ban to the level they would experience if the horn sounded. To simplify, if 10 accidents of equal severity were expected in a ban area with gated crossings, a reduction of .40 would be required B to a level of 6 accidents B in order the retain the Pre-Rule Quiet Zone (unless a smaller reduction in accidents would place the Quiet Zone Risk Index below the NSRT). As a matter of technical practice, the factor is applied to the crossing's risk index.
- 4/ Crossings on the FEC are currently subject to Emergency Order No. 15. FRA had found an alarmingly large increase in the accident rate when nighttime bans were imposed at crossings with flashing lights and gates.

10. Funding

A number of commenters expressed concern that the NPRM was silent as to potential funding sources for implementation of the proposed rule. Generally, commenters indicated that without additional funding being made available, quiet zone implementation would be beyond the financial reach of many communities. Several commenters suggested that the Federal government should provide the funding necessary to implement quiet zones, while other commenters suggested that the operating railroads should provide the funding or that the costs

should be shared among some or all interested parties (including Federal, State, and local governments, as well as railroads, shippers, and other users of the rail system).

Several individuals and local governments, citing local budget constraint concerns, suggested that if the Federal government is going to require additional safety measures at highway-rail crossings, then the Federal government should provide the funds for such measures. One individual representing a group of Massachusetts families suggested that the costs of safety at highway-rail crossings should not be the sole burden of communities abutting the railroad, because the general public uses highway-rail crossings. This individual suggested that the NPRM effectively proposes a tax on innocent citizens to protect those who willfully violate traffic laws by illegally proceeding around grade crossing safety devices in attempts to beat the train. A few individuals suggested that the costs of implementing quiet zones should be shared among the Federal government, railroads and local communities. One of these commenters further recommended that because the rail system is a national resource, the resulting noise impacts are a national issue. Accordingly, this commenter suggested that communities disproportionately affected by railroad noise should not have to provide a disproportionate amount of funding to solve the problem of railroad noise. This commenter recommended the development of a formula to effectively normalize the amount of funding communities would be required to contribute to the implementation of quiet zones within their jurisdictions, based on norms present throughout the United States.

Other individuals commented that because the impact necessitating the proposed rule has resulted from railroad operations and the railroads are the parties that profit from rail operations, any mitigation measures should be the responsibility of the railroads themselves. In addition, one local Sacramento, California business suggested that implementation of quiet zones would

result in lower insurance and litigation costs for railroads, and thus, railroads should share in the costs of implementation.

Although most local governments indicated that due to existing budget constraints, implementation of quiet zones would be very difficult without the allocation of additional Federal funds, some local governments did provide ideas for alternative sources of funding. For example, the City of Moorhead, Minnesota has set up a special downtown taxing district to fund the safety measures necessary to implement a quiet zone. The City of Miami Springs, Florida, proposed imposing a user fee, similar to that of airlines, for both passenger and freight rail traffic. Other local governments proposed imposing local property taxes on railroad right-of-ways to help fund safety improvements in order to implement quiet zones (a measure that would be prohibited by 49 U.S.C. 11501 which bans discriminatory taxation of railroads).

Two Colorado municipalities, the City of Brighton and the City of Fort Collins, requested confirmation that quiet zone crossing safety measures qualify for Federal Highway Administration (FHWA) funding. Another Colorado municipality, the City of Winter Park, requested that either new Federal funding for implementation of quiet zones be made available or the current Federal crossing safety program be expanded to include crossing improvements necessary to implement quiet zones.

Although every commenting State also expressed concern regarding potential funding sources, citing a general lack of availability of State funds, some States specifically recommended against allocating Federal safety funds to finance the implementation of quiet zones under the proposed rule. Specifically, both the North Carolina Department of Transportation (ADOT) and the Ohio Public Utilities Commission (AOPUC) indicated that the proposed rule is directed at quality of life issues, not highway-rail grade crossing safety.

Accordingly, each agency strongly recommended against the use of Federal safety funds to finance safety measures necessary to implement quiet zones. In its comments, OPUC specifically expressed the belief that funding for projects in connection with the establishment of quiet zones should not come at the expense of the State's ongoing grade crossing safety programs. OPUC stated that [g]rade crossing safety must not be compromised at some crossings in exchange for relative peace and quiet at a handful of other crossings. Thus, OPUC argued that funds already committed to traditional grade crossing safety programs should not be used to fund quiet zone projects. Likewise, the Illinois Commerce Commission stated that the proposed rule would distort the State's multi-year grade crossing safety enhancement planning process and force the State to redirect needed funding from important safety projects to what the agency described as Federally mandated noise suppression projects.

In addition, explaining that the cost of SSMs will be prohibitive to many State DOTs and many communities, the North Dakota DOT suggested that the proposed rule would increase demand for already limited Federal safety funds if such funds are made available to finance the installation of safety measures under the proposed rule. Accordingly, the North Dakota DOT specifically recommended against the use of Federal safety funds to implement quiet zones. The New York DOT, on the other hand, requested that additional Federal safety funds be made available to implement projects under the proposed rule.

Railroad industry participants expressed the view that railroads should not be responsible for the costs of installing, maintaining, or repairing, the additional safety measures required to implement quiet zones under the proposed rule. These commenters suggested that funds be made available through the relevant highway authorities or the FHWA. One commenter, the

American Public Transportation Association, specifically requested that FRA address this issue in a joint rulemaking with FHWA.

Despite the wishes of the commenters, Federal funds have neither been authorized nor appropriated specifically for implementing this rule. Indeed, 49 U.S.C. 20153(A)(3) specifically provides that SSMs are provided by the appropriate traffic control authority responsible for safety at the highway-rail grade crossing . . . While there are no dedicated funds set aside for the costs incurred in developing and implementing a quiet zone under this rule, there are several categories of transportation funding available that may be used by States and localities for this purpose. FRA wishes to emphasize that at the outset that it is unlikely that most improvements undertaken under this rule would withstand the priority ranking requirements for safety projects under Federal-aid highway programs, since the improvements may be approximately neutral with respect to safety (as compensation is made for the additional risk associated with silencing the train horn). However, those funds constitute only 10% of one of the two major programs. Further transfer between the two programs may be possible. Further detail on Federal-aid programs follows:

The Transportation Equity Act for the 21st Century (TEA-21) was enacted June 9, 1998 as Public Law 105-178. TEA-21 authorizes the Federal surface transportation programs for highways, highway safety, and transit for the 6-year period 1998-2003. TEA-21 is the current legislation that funds both the Surface Transportation Program and the National Highway System Program. The Surface Transportation Program consists of a 10% safety set-aside and the balance of the program, which is intended for general transportation improvements off the National Highway System.

The requirements for the Highway-Rail Grade Crossings and Hazard Elimination Programs are defined in "130 and 152, respectively, of Title 23, United States Code. Projects funded with Section 130 funds (23 U.S.C. 130) are intended to reduce the number and severity of train collisions with vehicles and pedestrians at highway-rail grade crossings. Typical projects include active warning devices (e.g. flashing lights and gates), signing and pavement markings, illumination, crossing surface improvements, grade separations, sight distance improvements, geometric improvements to roadway approaches, and the closing and/or consolidation of crossings. All public grade crossing safety improvements are eligible for funding under this program, but obligation of funds is subject to strict requirements for ranking the priority of projects on a State-wide basis. Although use of Section 130 funds for projects under this rule will be warranted *only* where those improvements exceed the minimum targets for risk reduction set by this rule *and* where the projects are legitimately ranked as top priorities within the State, it is important to remember that the bulk of the approximately \$4.1 billion expended under the Section 130 program since 1974 has been used to improve crossing safety on city and county roads across the Nation, including in whistle ban jurisdictions. Indeed, the automatic warning systems required by several States as a predicate for whistle bans and which are required in this rule for New Quiet Zones--were in most cases installed with primarily Federal funds. Thus prior Federal funding has already assisted local governments to some extent in preserving Pre-Rule Quiet Zones and creating New Quiet Zones.

Section 152 funds (23 U.S.C. 152 (Hazard Elimination Program) are intended to implement safety improvement projects to reduce the number and severity of crashes at hazardous highway locations, sections, and elements on any public road. Typical projects include intersection improvements (channelization, traffic signals, and sight distance); pavement and

shoulder widening; guardrail and barrier improvements; installation of crash cushions; modification of roadway alignment; signing, pavement marking, and delineation; breakaway utility poles and sign supports; pavement grooving and skid resistant overlays; shoulder rumble strips; and minor structure replacements or modifications. It is important to note that grade crossing improvements can be funded under Section 152 if they are identified in a State's hazardous location survey.

The difference between the sum of the funding levels for Sections 130 and 152 and the overall 10% safety set-aside in STP is in a category called Optional Safety Funds and is eligible for use in either Section 130 or Section 152. In FY 2000, there was a total of \$368 million available in Optional Safety Funds, but only \$21 million (or 6%) was used on Section 130 grade crossing safety enhancement. Clearly this is an area where States can be encouraged to change the mix of safety projects advanced using this funding to accommodate more grade crossing safety improvements.

It should be noted that 90% of the STP funds are available for general use. Local Metropolitan Planning Organizations, working with the State departments of transportation, help determine how those funds should be allocated. As FRA was advised by commenters in this proceeding, community transportation needs differ. Without question, engineering improvements under this rule would constitute eligible projects deserving of consideration for use of this 90% share.

Under Section 1103(c) of TEA 21, an amount of \$5,250,000 per year was set aside from STP funds, and this funding is to be used for projects on designated high speed passenger rail corridors. Should a quiet zone be desired on a portion of such a designated high speed corridor, such funds could be used as a part of the overall high speed corridor improvement project.

Given the relatively small amount of funding available under Section 1103(c), it is perhaps unlikely that any quiet zone improvements would rise to the top of the list on any such corridor. However, note that there is a strong compatibility between the kind of safety improvements desired for high-speed rail corridors (sealed corridor treatments) and the supplementary safety measures identified in this rule.

Transfers of funds from other categories into the STP are permitted, and any such transfers are not subject to STP set-asides or sub allocations.

- Up to 50 percent of National Highway System (NHS) apportionments may be transferred to the STP; indeed, up to 100 percent of NHS funds may be transferred to STP if approved by the Secretary of Transportation, and if sufficient notice and opportunity for public comment is given.
- Up to 50 percent of Interstate Maintenance apportionments may be transferred to STP.
- Up to 50 percent of Bridge Replacement funds may be transferred to STP.
- Funds apportioned to the Congestion Mitigation and Air Quality (CMAQ) Program may also be transferred to STP, subject to the following conditions. Up to 50 percent of the amount by which the CMAQ apportionment for the fiscal year exceeds the amount that would have been apportioned to CMAQ for that fiscal year if the program had been funded at \$1.35 billion annually may be transferred to STP. Transferred CMAQ funds may only be used in air quality non-attainment and maintenance areas.

Finally, please note that, with respect to roadways on the National Highway System, improvements would be eligible for funding out of the NHS.

The subject matter of this regulatory proceeding is the use of the train horn at highway-rail crossings, not the development of appropriations requests. Accordingly, FRA neither endorses nor argues against earmarked Federal funding for this purpose. FRA does note that, in general, State and local governments have argued against categorical transportation programs and in favor of broad block grants over which recipients could exercise full control. As reflected above, to a large extent that has become Federal policy. Whether any deviation from that policy is warranted by the fiscal impacts claimed to be associated with this rule is a matter for review in other forums. Accordingly, FRA's principal response to those arguing for Federal funding has been to ensure, to the extent practicable, that any expenses attributed to establishing Quiet Zones are no greater than necessary to maintain safety.

As this interim final rule was being drafted, the Congress and the Administration were preparing to address the reauthorization of surface transportation programs (extending or replacing TEA-21). That process was being complicated by reduced revenues, confirming FRA's conviction that this interim final rule should allow additional time for implementation of the rule. Although it is possible that the program structure outlined above may be reorganized significantly in new legislation, FRA does not expect any resulting reduction in the flexibility afforded to the States (working with local Metropolitan Planning Organizations) to affect the utilization of Federal transportation funds.

11. Liability

Several commenters noted that the NPRM was silent as to the issue of liability when an accident occurs at a highway-rail grade crossing within a quiet zone established in accordance with the rule. The New Jersey Department of Transportation (ADOT@) explained that consideration should be given to how liability issues presented by the rulemaking will affect

public safety. Several commenters suggested that legislation was necessary to prohibit lawsuits by anyone injured while circumventing highway-rail grade crossing safety devices within quiet zones. The Massachusetts town of Manchester-by-the-Sea commented that the NPRM appeared to be a paternalistic effort directed towards those who willfully violate traffic laws and illegally proceed around grade crossing safety devices. This commenter also expressed concern that railroads may be reluctant to agree to implementation of quiet zones under the rule for fear that it would increase their risk of liability if an accident did occur at a crossing within a quiet zone where the railroads did not routinely sound their locomotive horns. Manchester-by-the-Sea suggested that when there is willful conduct by a motorist or pedestrian that jeopardizes his life or those of others, e.g., proceeding through activated gate crossing devices, railroads and local communities should not be subject to liability if an accident occurs. Accordingly, the Town recommended that FRA work with Congress to codify limits to the liability of railroads and communities when those who willfully violate traffic or trespassing laws are injured at rail crossings within a quiet zone. Similarly, a Wisconsin State legislative representative suggested that local communities should not be liable for accidents occurring at grade crossings within quiet zones established under the rule.

The North Carolina DOT suggested that communities pursuing quiet zones in their jurisdictions should enter into agreements with the relevant State and operating railroads agreeing to hold harmless the State and railroads for any accidents or injuries that occur as a direct result of these quiet zones. This same commenter emphasized that the communities implementing quiet zones should assume all of the risk associated with the quiet zones.

Commenters from the railroad industry strongly advocated that municipalities seeking the establishment of quiet zones under the rule should assume liability for all accidents that occur at

crossings within the quiet zones. Citing the historical sounding of locomotive horns as a safety feature of railroads for the past century, the Florida East Coast Railway argued that if a community insists that it cease the sounding of the locomotive horns when traveling through its jurisdiction, then that community should be willing to accept the liability associated with the decision. The American Public Transportation Association projected that passage of a rule permitting quiet zones as proposed in the NPRM would probably lead to increased insurance premiums for railroads.

Another concern raised by several railroad industry participants, as well as an individual locomotive engineer, was the fact that State law often imposes liability on individual members of train crews and their employers when a train does not sound its horn at a highway-rail crossing and an accident occurs. These commenters contended that nothing in the NPRM would remove liability from individual train crew members or their employers for failure to sound the locomotive horn in the event of an accident in a quiet zone established pursuant to the rule. A representative of the Wisconsin Central System suggested that the rule should clearly state that failure to sound the locomotive horn in a FRA approved quiet zone could not serve as a basis for imposing civil liability on either the train crew or the employing railroad.

FRA appreciates the legitimate concern of the commenters regarding liability issues surrounding creation of quiet zones under this rule. We note that the proposed rule would have had the effect of relieving individual train crew members and their employers from liability for failure to sound the locomotive horn. The proposed rule clearly provides that establishment of a quiet zone created no legal duty to sound the horn in emergency situations. Because the rule clearly covered the subject matter of such a duty, it would have prevented State laws imposing such a duty. FRA does not expect that lawsuits will never arise over collisions, which may occur

at crossings within quiet zones, nor should FRA attempt to prohibit such suits since the cause of such collision may in fact be due to factors other than the lack of an audible warning. However, this rule is intended to remove failure to sound the horn as a cause of action in such lawsuits involving crossings within a quiet zone. We expect that the courts will determine liability issues based on the facts of each case and after reviewing the nature of this rule and its Federal requirements.

We expect that courts, following *Norfolk Southern v. Shanklin*, 529 U.S. 344 (2000) and *CSX v. Easterwood*, 507 U.S. 658 (1993), will conclude that this regulation substantially subsumes the subject matter of whether trains must sound warning devices at highway-rail grade crossings and, therefore, preempts state law on that subject.

FRA perceives no reason why establishment of quiet zones under this rule should result in higher insurance premium costs for railroads. In fact, a quiet zone under this rule should be evaluated as much less of an underwriting risk than a current whistle ban.

12. Wayside horn

During FRA's initial outreach process prior to issuing the NPRM, several commenters asked whether placement of a wayside horn (a horn at the crossing and directed at oncoming motorists) might be entertained as a supplementary safety measure. FRA also received comments in the docket and at the public hearings on this subject. It is apparent that there is interest in using such a device as an alternative means of providing an audible warning to the motorist of an approaching train.

A wayside horn system would typically consist of horns mounted on poles that are placed at the crossing. A horn would be directed towards each direction of oncoming vehicular traffic. The system would be activated by the same track circuits used to detect the train's approach for

purposes of other automated warning devices at the crossing (flashing lights and gates) and would produce a sound similar to the horn signal given by an approaching train.

At FRA's direction, the Volpe National Transportation Systems Center conducted an initial evaluation of two wayside horn installations at Gering, Nebraska in 1995 (Field Evaluation of a Wayside Horn at a Highway-Railroad Grade Crossing, Final Report, June 1998).

This evaluation noted that use of the wayside horn in lieu of the train horn reduced net community noise impacts. The evaluation also showed a 52% reduction in the number of incidents in which motorists continued to drive over the crossing after the warning device's gate arms had started to descend as compared to the baseline data collected with the train horn sounding. There was no significant difference between train horns and wayside horns for motorists that drove around lowered gates. While the report indicated improved driver behavior with the wayside horn, the report also contains analysis that suggests questions regarding the effectiveness of that particular installation in alerting motorists that should be answered before implementing wayside horns as a substitute for train-borne horns. Further, this evaluation did not contain adequate data or analysis to permit a determination of whether a wayside horn could fully substitute for train-borne audible warnings and additional evaluations at other sites should be performed. The NPRM suggested three questions related to the effectiveness of the wayside horn:

1. Does the particular system provide the same quality of warning, determined by loudness at appropriate frequencies, within the motor vehicle while it is approaching the motorist's decision point?

2. As currently conceived, a single stationary horn cannot give the motorist a cue as to the direction of approach of the train or trains. To what extent does this lack of directionality detract from the effectiveness of the warning? Can wayside installation design be altered to compensate?

3. To what extent will the stationary horn suffer from the lack of credibility sometimes associated with automated warning devices, due to the fact that it is activated by the same means? Over what period of time may this problem arise, if at all?

Since the installation of the original wayside horn system in Gering, NE, several other communities have installed wayside horns. These sites include: Ames, Iowa, Parsons, Kansas, Wichita, Kansas and Richardson, Texas. Additionally, other communities have had temporary test installations of the wayside horns.

This topic generated a number of comments from various parties. Additionally, the departments of transportation from Iowa, Nevada, Missouri and Florida all supported the inclusion of wayside horns as substitutes for train horns. The Brotherhood of Railway Signalmen (BRS) cited design flaws as an impediment to the effectiveness of wayside horns. The BRS also stated that if wayside horns were permitted by FRA, it would be imperative that the track circuits be used to detect the train's approach. The BLE stated that it felt that additional testing should be required before acceptance of the wayside horn.

Generally, commenters voiced strong support for the inclusion of wayside horns as a supplementary safety measure under the rule. States and local governments in particular, with the exception of the California Public Utilities Commission (CPUC), were in favor of including wayside horns as a supplementary safety measure. In support of their positions, these commenters cited the Volpe Center study and an Iowa Department of Transportation study, both of which have shown reductions in gate violation frequency with use of wayside horns. The

cities of Gering, Ames, and Wichita all supported inclusion of wayside horns as a substitute for locomotive horns. They expressed the view that there was great community support for wayside horns and felt that safety was improved. Ames, Iowa wrote . . . it [wayside horn] has tremendously improved the quality of life and safety for our residents. It is noted that Ames has installed wayside horn systems at three additional crossings. The city administrator for Gering, Nebraska also wrote that he had never received so many unsolicited thank you calls and letters from citizens as he had over the installation of wayside horns. These same commenters, along with at least one representative of the railroad industry, also indicated that they believed that wayside horns provide a more cost-effective alternative to train horns, than some of the other supplementary safety measures included in the NPRM. The Florida Department of Transportation (ADOT suggested that wayside horns be used in instances where it is impossible or impractical to install the supplemental safety measures articulated in the NPRM. The Florida DOT, however, did not elaborate on the rationale for limiting the use of wayside horns to situations where the installation of the identified supplemental safety measures is impractical or impossible.

The AAR suggested that there is more certainty regarding the effectiveness of the wayside horn than there is for the non-engineering measures included in the NPRM as alternative safety measures. In support of its assertion, the AAR submitted a copy of its report entitled *Wayside Horn Sound Radiation and Motorist Audibility Evaluation* that found that the latest model of wayside horn was louder than previous versions and concluded that wayside horns are a viable alternative to locomotive horns for audible warnings at highway-rail grade crossings. However, recognizing FRA's misgivings about the wayside horn noted in the NPRM, the AAR suggested that if FRA could not definitively determine the effectiveness of the wayside horn

prior to issuance of the final rule, FRA should permit use of the horns as supplementary safety measures at grade crossings subject to two conditions: (1) concurrence of the railroads operating at the crossings, and (2) demonstration of the efficacy of the horns at each crossing at which they would be installed.

The CPUC, however, asserted that there is currently insufficient evidence that the wayside horn can provide protection comparable to locomotive horns and opposed the use of wayside horns as a supplementary safety measure until further data on the effectiveness of the horns is collected. Other commenters voicing opposition to the use of wayside horns for the same reason included the BLE and the BRS.

In response to FRA's first specific question posed in the NPRM B whether wayside horns provide the same quality of warning within the motor vehicle as a locomotive horn while a train is approaching the motorist's decision point B a few commenters suggested that the wayside horn gives equal or greater audible warning. For example, the City of Wichita, Kansas, suggested that a wayside horn provides a uniform quality of warning within a motor vehicle because while wind, neighboring buildings, houses, fences and trees all affect the quality of warning of the locomotive horn on a motorist at a crossing, only wind would have an effect on the quality and uniformity of the warning of a wayside horn. Other commenters suggested that wayside horns provide consistent decibel levels directed exactly where motorists are driving (i.e., at the crossings, not down the tracks). The City of Roseville, California, cited a local wayside horn test that showed consistently higher audible warnings directed at the crossing, while reducing the noise impact to the surrounding communities.

In response to FRA's second question B whether the lack of directionality from a wayside horn detracts from the effectiveness of the warning B commenters supporting the use of

wayside horns generally agreed that the apparent lack of directionality does not detract from the effectiveness of these audible warnings. Wichita pointed out that as motorists approach rail crossings they often hear train horns from nearby crossings on different rail lines so it is not clear from which direction the train is coming anyway. The Kansas DOT suggested that the issue of direction is moot since wayside horns are used in combination with other automated warning devices (i.e., gates, flashing lights) and that when crossing gates are down, motorists are supposed to stop and wait for the train to pass, regardless of the direction in which the train is traveling. The Missouri Department of Economic Development suggested that wayside horns would encourage motorists' compliance because drivers cannot tell how far away from the crossing the train is by the sound of the wayside horn.

Only one commenter responded directly to FRA's third question B whether the wayside horn would suffer from the lack of credibility sometimes associated with automated warning devices due to false activations of the signal system. Wichita suggested that the annoyance associated with a wayside horn sounding in connection with an active warning system's false activation may cause earlier public reporting, and thus quicker railroad response to the problem location.

Several additional studies have been conducted on the wayside horn since the initial study in Gering, NE. Ames, Iowa. One study (Evaluation of an Automated Horn Warning System at Three Highway-Railroad Grade Crossings in Ames, Iowa, by Gent, Logan and Evans, 2003) documented the reduced noise impact to the community, public acceptance of the horn system through surveys of residents and motorist, and locomotive engineer opinions that the system was safe or safer than the locomotive horn (obtained through surveys). No data on actual

driver behavior at the crossings were collected in this study. This study did not analytically address any of the three questions posed by the Volpe study.

The Wayside Horn Sound Radiation and Approaching Motorists Audibility Evaluation (Mike Fann and Associates, May 2000) examined the sound levels and frequencies emitted by the wayside horn. This research collected data that showed that system that was tested provided a sound level of 98 dB at 100 feet from the wayside horn. The sound level that was produced met FRA's regulation for a locomotive horn that requires a minimum sound level of 96 dB at 100 feet from the front of the locomotive. The study also measured the frequency content of the wayside horn and using signal detection theory indicated that 99% of drivers with only a partial anticipation of a train event should hear the warning. No data were collected on actual driver behavior. This study provides information towards answering the first question suggested by the Volpe study. The sound level measured for the wayside horn meets FRA sound level requirement. Signal detection theory and measurement of the frequencies contained in the wayside horn indicate that the driver should be able to hear the wayside horn. Neither the Ames nor Fann study addresses questions two and three concerning directionality and credibility of the warning.

Texas Transportation Institute of Texas A&M University was engaged by a manufacturer of a wayside horn system to revisit one of the crossings in Gering, NE to assess the level of driver compliance with the warning system after approximately six years of operation. Video data of driver behavior at the crossing was collected for 16 days. Driver compliance with the warning devices was then analyzed in the same manner as the 1995 Volpe study. The study, entitled A Safety Evaluation of the RCL Automated Horn System (Roop, May 2000), showed that after six years of operation of the wayside horn that driver compliance with the automatic

warning devices at the crossing (flashing lights with gates) was slightly better than the baseline driver behavior observed when the locomotive train horn was used. It should be noted that there was a noticeable decrease in driver compliance with the use of the wayside horn from 1995 to 2000. However, driver behavior in 2000 with the wayside horn was still slightly better than the 1995 driver behavior with train horns. This research goes towards answering question number three.

After review of the accumulated experience with the use of wayside horns, FRA has determined that the use of wayside horns at crossings equipped with automatic flashing lights and gates as a replacement for train horns has merit under certain well-defined conditions. It has been clearly shown that wayside horns significantly reduce the noise footprint that a community would experience when compared to the routine sounding of train horns. At locations where wayside horns have been installed, community acceptance has been great and city officials cite that there has been no decrease in safety at the crossings. TTI's study that revisited the original Gering, NE study after six years of wayside horn use indicates that the wayside horn at that location is still as effective as the locomotive horns used during the baseline period.

The Northwestern University Center for Public Safety evaluated the effectiveness of the wayside horn at three crossings in Mundelein, Illinois. The study, entitled, Evaluation of the Automated Wayside Horn System in Mundelein, IL (Raub, Lucke, January 2003), utilized video monitoring of driver behavior, sound level measurements and survey instruments to: 1) assess the impact of wayside horns on the behavior of drivers; 2) measure loudness of train horns and the wayside horns in neighborhoods; 3) obtain the opinions of locomotive engineers on perceived changes in driver behavior; and 4) obtain the opinions of residents on the differences between locomotive horns and wayside horns. The Village of Mundelein, located 35 miles north

of Chicago, has 40 to 50 trains per day passing through. A baseline of driver behavior was collected for three months during which there were 10,382 gate activations. There were 367 incidents of drivers disregarding the active warning devices (flashing lights and gates) during this period. Locomotive horn use was then discontinued, and the use of the wayside horns was instituted. Data was not collected until four months had passed to allow for the novelty effect of the wayside horns to pass. Video data was then collected for three months during which there were only 97 incidents observed during the 8,683 gate activations. The study results indicated a 70% decrease in the number of times drivers disregarded the warning devices. Additionally, noise levels in residential and business areas located near the tracks decreased by 80%. As in the Ames, Iowa study, there was acceptance of the system by both the public and locomotive engineers. Ten out of the 12 locomotive engineers surveyed felt that the wayside horn was as safe, or safer, than the use of the locomotive horn. This study contributes towards answering question 2 by providing additional data on the effectiveness of wayside horns in reducing incidents of driver disregard of the warning devices. While the study does not quantitatively study question 2, it can be inferred from the data that the lack of directionality does not contribute to an increase in incidents of driver disregard of the warning devices.

The interim final rule issued today provides that wayside horns may be used in lieu of locomotive horns at crossings equipped with automatic flashing lights and gates. See ' 222.59. Although clearly a wayside horn produces sound, because of its lower noise impact on the surrounding community, it may be installed within a quiet zone if the public authority determines that it is appropriate to do so. If used within a quiet zone, the risk at a crossing equipped with wayside horns will not be included in calculating the Quiet Zone Risk Index or Crossing Corridor Risk Index. It also should be noted that wayside horns have not yet been classified by

FHWA as traffic control devices. If FHWA does classify them as traffic control devices, the wayside horn must also be approved in the Manual on Uniform Traffic Control Devices (MUTCD) or FHWA must approve experimentations pursuant to section 1A.10 of the MUTCD.

13. HORN SOUND LEVEL AND DIRECTIONALITY

Train horns are clearly a major source of unwanted noise in communities through which active railroad lines pass. FRA included in the NPRM provisions designed to limit the dispersal of horn noise into the community where the sound does not serve its warning purpose. These provisions were a maximum limit on horn sound output and a limit to sound emanating to the side of the locomotive. FRA has a long history of working with the railroad industry to improve locomotive cab working conditions and has been sensitive in this rulemaking to balance the need to reduce noise exposure to operating crews with community noise concerns. With the release of the NPRM and accompanying Draft Environmental Impact Statement, FRA gave needed consideration to the mitigation of locomotive horn noise on communities.

The NPRM proposed limiting the horn sound emanating to the side of the locomotive to no more than the sound measured to the front, and FRA had anticipated that this might cause railroads to modify their horns to reduce some of the unwanted noise. Many commenters supported these provisions and strongly favored reducing maximum horn sound output levels from the high levels in general use. The NPRM discussed a maximum sound level from horns of 104dB(A) for crossings with active warning devices and 111dB(A) for passively signed crossings. Communities generally commented in favor of using the lower sound level in all cases. On the other hand, the NTSB commented that there is a need for high sound levels to overcome vehicle noise and to provide adequate warning at passive crossings where significant

responsibility and discretion is left to the driver. The BLE preferred a variable horn that would allow the engineer to decide when the high horn level was needed.

Because this issue presented complex questions that were not likely to be emphasized in testimony on the extensive NPRM, and because FRA sought to put detailed questions to the railroad industry regarding the horn, FRA held a Technical Conference on Locomotive Horns during the comment period. The conference was attended by railroads, the AAR, locomotive builders General Electric and General Motors, and other industry representatives. In the conference, AAR made FRA aware that the testing procedures set forth in 49 CFR 229.129 were causing a misperception regarding center mounted horns. Because the existing ' 229.129 requires measurement of horns 100 feet in front of the locomotive and 4 feet above the rail, it was claimed that an acoustical shadow is cast on the measurement device by the locomotive body when center mounted horns are sounded. This acoustical shadow dissipates quickly as one moves further away or to the side of the locomotive. It was suggested that the testing procedures were giving the impression that center mounted horns were louder to the side than to the front. Conference participants complained that the proposal limiting the horn sound emanating to the side of the locomotive would force them to relocate horns onto the cab from the center of the locomotive, and would increase crew noise exposure. The use of shrouds or shields had been tried by railroads in attendance, and they did not consider them practical. The technical conference also helped FRA understand the railroads' strong commitment to remain using compressed air warning device systems and the many difficulties involved in equipping and maintaining horn systems.

After reviewing the results of the technical conference and comments on the horn provisions, FRA decided to conduct further tests to quantify the effects of horn placement and

the influence of variations in available air horn models. A series of stationary tests were performed by the Volpe National Transportation Systems Center (VNTSC) at the Transportation Test Center in Pueblo, Colorado from April 10 to 12, 2001. The results of these tests showed that the shadow effect is very pronounced at the measurement location specified in existing ' 229.129. When the traditional cab roof horn location was compared in these tests with the center of the locomotive body horn location, which is current practice, the difference in location produced no meaningful change in community noise exposure nor in the warning signal projected beyond the immediate shadow of the locomotive body. Horns located on the locomotive nose produced less objectionable community noise but also resulted in weaker warning signals and resulted in higher noise levels in the engineer's cab. FRA learned that Transport Canada recently sponsored moving tests of locomotive horns, which showed meaningful differences in the effectiveness of the warning signal provided by horns mounted on the cab roof versus those mounted on the center of the locomotive body. The research indicated that horns mounted at the front of the locomotive on the cab roof produced a more effective warning signal. Because the results of the stationary tests and the technical conference did not justify the provision for a maximum sound limit to the side of the locomotive, it has been eliminated from this interim final rule. However, because the Canadian research indicates that horn location may be a factor in the effectiveness of the warning signal, further research is needed before any regulatory changes are made.

FRA has determined that by changing the measurement procedures in ' 229.129, the effect of the shadow can be removed from horn measurement. FRA believes that this simple change, with the additional requirement of remaining below a maximum sound level, will have the effect of normalizing the sound output of all horns. The interim final rule requires that horns

be measured at the familiar location, 100 feet in front of the locomotive, however the sound level meter receptor is to be mounted at 15 feet above the rail (i.e., out of the locomotive's shadow).

FRA also continued to review and refine the signal detection theory application previously developed by the FRA Office of Research and Development and reported by the Volpe Center (Railroad Horn Systems Research, USDOT FRA/VNTSC, January 1999) using newly gathered horn measurement data. While lower sound levels would reduce community noise impact, an understanding of the relationship between horn sound level and its detection by motorists is needed to preserve the safety function of the horn. The detectability model was applied to the most critical safety condition at passive crossings where no other audible or visual warning device is present and where vehicles typically are approaching the crossing at speed. In this case the model suggests that a high likelihood of detection will occur when the horn is producing 108dB(A) at the measurement location, 100 feet in front of the locomotive and at 15 feet in height. FRA added a margin to this level to account for variability in the sound level meters and other factors and set the maximum level at 110dB(A). Although FRA employed the best available tools and knowledge to arrive at this level, additional research may, over time, suggest a different maximum level.

This interim final rule requires railroads to comply with the maximum horn level of 110dB(A) using the new measurement procedures to certify their locomotives. Compliance with the provision is required for new locomotives upon the effective date of this rule, which is one year after the date of publication of this rule. Additionally, each existing locomotive shall be tested within five years of this publication date and when rebuilt as determined pursuant to 49 CFR 232.5. FRA also anticipates that whenever repairs or modifications are performed to

locomotives that affect the performance of the horn system, the railroad will re-certify the locomotive horn to comply with ' 229.129.

With the establishment of the maximum sound level for locomotive horns, FRA has also eliminated a plus and minus tolerance in making compliance measurements of horns. FRA anticipates that railroads will set their horns to be somewhat louder than the minimum and quieter than the maximum to account for the minor inaccuracies of the Type II sound level meters currently available. While FRA currently uses Type II sound level meters to test for compliance with part 229.129, FRA may use Type I sound level meters in the future.

Considerable effort has been expended to establish and quantify both the significant risk reduction from regular use of locomotive horns and also the level of sound that needs to be delivered to be detectable. FRA continues to study these issues and may revise these requirements as new information becomes available.

FRA also gave serious consideration to the option of requiring a two-level horn selectable by the locomotive engineer. This approach might allow a lower sound level for actively signed crossings. Historically, horns had been fitted with modulating valves that did provide some latitude for adjustment of the sound level, and communities exposed to today's automatic sequencing horns have expressed concern at the results. However, there are a variety of practical considerations that FRA would need to consider that have not been fully developed in this proceeding before any mandatory standard could be issued (e.g., the difficulties created by passively- and actively-signed crossings in close proximity to one another). FRA will continue a dialogue with railroads and communities on this issue. The rule does not foreclose this approach where it fits local conditions, and FRA will encourage railroads using locomotives that are dedicated to particular line segments to explore this option.

Steam locomotives

FRA has elected not to address horn sound levels on steam locomotives in the rulemaking. Steam locomotives constitute a small fraction of the locomotive fleet and are mainly concentrated on tourist and scenic railroad operations with infrequent service in a largely rural area. Given the strained financial circumstances of many museum and tourist operations, and the limited noise impact the small number of steam locomotives have on local communities, FRA has not, at this time, elected to apply the maximum sound level limits to steam locomotives. It should be noted, however, that a railroad operating a steam locomotive within a quiet zone must silence its steam whistle in accordance with this rule.

14. Chicago Regional Issues

A. Introduction

The six-county Chicago Region is host to the largest rail terminal area in the Nation, and it accounts for the biggest concentration of whistle bans and associated casualties. Chicago communities and Chicago industries have grown up with and around the extensive rail complex, and the metropolitan area has benefited greatly from an extensive commuter rail system established by the State and funded by the State and region with Federal assistance. Chicago's Union Station is also a major hub for Amtrak intercity service. The most voluminous and many of the most spirited comments we received came from Chicago Region organizations and residents who wished to maintain existing whistle bans. The train horn issue has a unique history in the region that has contributed to the need for different treatment with respect to the impact of no-whistle policies at gated crossings. For these reasons, we provide considerable detail on train horn issues in the Chicago Region.

This section of the preamble describes the regulation of horn use at the State level in Illinois, explores its implications for horn use and safety at the Chicago regional level, reports the comments from Chicago Region and State officials in this proceeding, discusses the difficulties in obtaining reliable and consistent data on where Chicago Region whistle bans were actually in effect at a given time and how FRA has attempted to resolve those difficulties and data anomalies, and explains the actions FRA has taken in the interim final rule to respond to Chicago-area concerns.

B. Legislative and Administrative Actions in Illinois

The recent history of train horn use in the Region has been reported to FRA as follows. Historically, the State of Illinois tolerated local ordinances banning whistles, and it appears railroads had observed them to a substantial extent. On July 29, 1988, Illinois Public Act 85-1144 (625 ILCS 5/18c-7402) became effective, requiring that the horn be sounded by registered rail carriers at all public highway-rail crossings.⁵ Railroads complied, resulting in a substantial public outcry and court action.

The Illinois Commerce Commission (ICC) responded by excusing (exempting) all registered carriers from sounding horns at all highway-rail crossings which (i) were provided with automatic flashing light signals, or flashing light signals and gates, and (ii) had experienced less than three accidents involving a train and a vehicle within the prior 5 years.⁶ In general, to qualify for being exempted, it appears that the crossing was required to have had the same type

⁵A copy of the Illinois code provision, and copies of major Commission orders, have been placed in the docket of this proceeding. This material was provided by the Commission at FRA request.

⁶Three accidents at a single crossing within 5 years is a very large multiple of the typical accident experience among public crossings. Most individual crossings will not experience a single accident over a 10-year or greater period.

of warning system in place over the past 3 years. ICC Docket Nos. T88-0050 (orders of August 31, 1988; September 8, 1988; and October 12, 1988) and T88-0053 (orders of August 31, 1988; October 12, 1988; and January 25, 1989).

Notably, the Northeast Illinois Regional Commuter Railroad Corporation (Metra) was not a named party in the ICC proceedings. Metra is not regulated as a registered carrier due to its status as a public benefit corporation of the State of Illinois (and accordingly is also not required to sound the horn at crossings under State law).

By contrast, Metra service *operated by freight railroads as contractors* to Metra, and Metra service *provided over lines controlled by freight operators*, has been subject to the State law and the jurisdiction of the Commission. Under Docket No. T88-0050 the ICC addressed crossings on the lines of Metra's freight partners. The Commission initially found all crossings meeting the basic requirements (active warning and fewer than 3 accidents in 5 years) to be reasonably and adequately protected with the exception of two crossings.

The Commission further found 16 crossings adequately protected despite the occurrence of (in one case) up to 5 accidents in the previous 5 years, stating that at least part of that finding is based on a commitment by or on behalf of the named governmental units to increase enforcement of State laws as they apply to motorists obeying automatic flashing light signals and gates . . . The Commission went on to require reports referencing enforcement and awareness programs at the 16 crossings, stating in effect that it expected to see an increase in safety enforcement activity (Interim Order of August 31, 1988 at 3). Notations attached to the copy of this order provided by the Commission indicated that, in addition to the said 16 crossings, 29 crossings were initially identified for exemption under this order. In a subsequent interim order

of September 8, 1988, the Chicago and Northwestern was excused from sounding the horn at the Nagle Avenue crossing, again based on a commitment for law enforcement and education.

The final order in this docket provided by the Commission was dated October 12, 1988. In this order the Commission revised its express decisional criteria as to at least the Nagle Avenue crossing, stating that certain of the accidents at that crossing were the result of persons deliberately ignoring the flashing lights and driving their automobiles around the gates.⁷ The commission also provided relief for two named crossings where warning systems had been recently upgraded (notwithstanding the previous accident history). The net effect of these actions appeared to have left the majority of the roughly 565 crossings on the Metra system subject to the requirement that the train horn sound (or left them unaddressed from the point of view of State law due to Metra's unique self-governing status). However, that may not have been the case, as FRA has not had the opportunity to review the entire file of the proceeding; and inquiries to the Commission to clarify this point were complicated by the passage of time and turnover of rail leadership. As noted below, if that was the case it was swiftly altered by proceedings in another docket.

Highway-rail crossings off the Metra system were subject to ICC Docket No. T-88-0053. The ICC initially entered an emergency order excusing the sounding of the horn under the basic criteria previously described (August 31, 1988). A total of 113 crossings with automated warning devices were identified for continued sounding of the horn based upon the occurrence of 3 or more accidents between June 1, 1983, and June 1, 1988. On October 12, 1988, the

⁷This constitutes the leading cause of collisions sought to be prevented by this rulemaking, although the horn also has value to the motorist who has misunderstood the message sought to be conveyed by the traffic control device, has stalled on the crossing and needs to vacate the vehicle, or who is faced with an activation failure.

Commission entered an interim order carrying forth this pattern, but adding exemptions for crossings that had experienced recent safety improvements. It appears that the list of not excused crossings was reduced to 50, with another 9 crossings set for exemption upon completion of planned improvements.

The final order in ICC Docket No. T88-0053 was entered on January 25, 1989. It incorporated 2 crossings on a Soo Line Metra route (previously omitted from T88-0050), which were identified as not excused. ***The Commission order stated that Appendix 1 listed all crossings where sounding the horn was not excused under both dockets (T88-0050 and T88-0053).*** Appendix 1⁸ was a list of 53 crossings said to be not excused, 9 of which were to be excused upon completion of improvements and one of which is separately marked as not excused under docket T88-0050. Of the 53 crossings not excused, 23 were in the Chicago Region. Accordingly, by early 1989 the great majority of crossings in the Region were excused, but 23 with the highest number of recent accidents remained not excused.

After its initial actions in the 1988-1989 period, the Commission evidently adjusted the terms of the exemptions over time, but the basic practice remained in place. In 1994, the Commission conducted a review of the train horn issue under Docket No. T91-0082. The Commission's order of February 24, 1994, summarized its actions to that point as follows:

After hearings and by orders in those dockets the Commission excused registered rail carriers from whistling at crossings under the terms and conditions as set forth hereinabove; at additional crossings where a review of the type of accident at a specific crossing indicated that whistling would not have prevented the accident and at other crossings where governmental authorities agreed to increase their enforcement activities of existing statutes governing rail crossings, increase safety programs/presentations to the

⁸The attachment FRA received from the Commission did not bear the docket caption, but the Manager of the Railroad Safety Section of the Commission confirmed that FRA had received the correct item and that the caption had been obscured during copying.

public regarding same, and report to the Commission at six month intervals those enforcement/presentation activities for a period of two (2) years.

The Commission went on to indicate that the present order was intended to take into account the accident history since the initial orders, as well as changes in crossing status. In reporting the findings of hearings and letters in this docket, the Commission noted that a number of Chicago-area railroads, including Norfolk Southern, Illinois Central, CSX and Chicago Northwestern (for crossings outside its suburban commuter territory) indicated that they *would sound horns at all crossings even if excused*. Order at 3. Though most of the communities participating in the proceeding sought exemptions for crossings within their borders, the City of Chicago stated it had no objection to use of the horn.

The Commission consolidated the previous dockets under the new number, rescinded previous orders and entered findings that made adjustments based on experience, including excusing use of the whistle at additional crossings that were reasonably and sufficiently protected. In one instance sounding the horn was excused at a crossing where a driver ignored operating gates and was hit and citations for violating the gates were issued to that driver . . . Id. at 5. But the Commission indicated that carriers would be required to sound the horn at new highway-rail crossings that had not been in service for 5 years, even though equipped with automatic warning systems.

The Commission was explicit in stating that the statute does not give the Commission any authority to prohibit the sounding of such whistle warnings . . . Id. at 5. The order notes that, in fact, if communities wanted carriers to sound the horn they could request that they do so despite exemptions; but there is no suggestion that local jurisdictions could require railroads to honor exemptions by running silent. Attachment 1 to this July 1994 order listed 53 crossings at which

carriers were not excused under the new order (39 older crossings and 14 new crossings). There is little overlap between the crossings in this list and those specified as not excused in the commission order in the previous docket.

The Commission subsequently entered an amendatory order in Docket No. T91-0082 (dated July 20, 1994) making various adjustments to the prior order. The major effect was to cut back the list of new crossings with insufficient exposure to 4 from 14 (so that carriers were excused at another 10 crossings).

The Commission actions of 1994, which were based on accident data through June 1, 1991, apparently had the effect of excusing most of the Metra system crossings operated or dispatched by contract carriers, with the exception of 5 Soo Line crossings. However, 14 additional Chicago Region crossings without commuter trains were not excused.

In its 1994 orders, the Commission was silent with respect to the wisdom of continuing to excuse crossings with fewer than 3 accidents in a specified 5-year window in the past. The movement in the pattern of exemptions from 1988 to 1994 was significant. If the Commission considered the possibility that (i) sounding the train horns may have reduced the risk of collision in the period 1989-1991 for crossings that had previously experienced 3 or more collisions within the overlapping previous period and (ii) excusing compliance with the train horn at those crossings might drive the risk back up, the record available to FRA is silent with respect to such consideration.

C. Actual Practice Sounding Train Horns in the Chicago Region

It is clear that, particularly prior to 1994, ICC orders excusing the use of the locomotive horn contained significant exceptions, and certain exceptions (applicable to largely different crossings) apparently continue to date. While the ongoing rationale for Commission decisions is

apparently not consonant with the principles later applied in Federal legislation leading to this rulemaking, Commission orders without question have tended to withhold relief from use of the horn for a significant number of crossings that are very high risk. In some cases, communities may have been stimulated to engage in enforcement or education efforts in order to support exemptions.

It is also apparent that freight railroads have taken disparate points of view with respect to exemptions, with some electing to blow the horn at all crossings and others taking a more selective approach.

Much of the highway-rail crossing safety exposure in the Chicago Region is found on the Metro commuter rail network, which includes the following:

- Lines over which Metra has operated service directly and subject to its own rules throughout the period 1988 to date (the Rock Island District, South Shore Line, Southwest Service, and the Electric District);
- Lines on which Metra operates in effect as a tenant, with the freight railroad imposing operating rules and providing dispatching (Milwaukee District West and North lines (Soo Line) and the Heritage Corridor (CN));
- New service established using Metra crews over Wisconsin Central in 1996 (North Central Service); and
- Freight lines over which the freight railroads provide Metra service as contract operators (UP North Line, UP Northwest Line, Wisconsin Central North Central Service, and BNSF Aurora line service).

Most of these lines carry significant freight volumes, as well as significant numbers of daily commuter trains.

Throughout the period Metra has enjoyed discretion with respect to whether to sound the locomotive horn at crossings where it provides service directly, and Metra's host railroads and contract freight operators have also enjoyed significant latitude as a result of the ICC exemption policy. Metra testimony and filings in this docket indicate that 69% of the 565 public grade crossings on the Metra route system were no-horn crossings as of spring 2000. It follows that Metra trains sounded horns at about 175 crossings and did not sound the horn at about 390 crossings during that time period, but the picture may have been somewhat different during earlier periods. FRA concludes that Metra and its contractor operators have exercised discretion in whether to sound horns, even where exemptions from the State mandate existed, based upon safety concerns and community quiet concerns. Given FRA's knowledge of safety programs, FRA believes that Metra has likely tended to emphasize safety where risk is known to be relatively high based on factors such as crossing characteristics (angle of intersection, complexity of the roadway geometry including nearby roadway intersections, history of accidents, crew reports of near hits, and other factors). According to the ICC, Metra has also utilized some time-of-day partial bans to address infrequent train movements during early morning hours. While freight railroads in the Chicago Region have apparently run silent as commuter operators over crossings where horn sounding was excused, they have been much more likely to use the horn when operating freight trains for their own accounts.

D. Current Chicago Region Whistle Ban Status

Quite obviously, the fact that the ICC excused use of the horn does not mean that trains are running silent over the crossing. The current total number of crossings in no-whistle status in the Chicago Region is apparently significantly smaller than the original 846 identified by the AAR and others in the early 1990's. As of August 3, 2000, the ICC was estimating only 23 no-

whistle freight-only crossings, all on the Indiana Harbor Belt, and 320 crossings used by passenger and freight trains (Metra system), for a total of 343 no-whistle crossings. Of this number, 13 were affected by bans only during part of the day (e.g., nighttime or off-peak), and the remainders were 24-hour bans.

Information provided by the AAR on October 24, 2000 indicated a total of 28 no-whistle freight-only crossings in the Chicago Region and 227 no-whistle crossings on the Metra route system for a total of 255. The AAR noted that none of these railroads operates at public crossings in Chicago without sounding the whistle unless the crossings are equipped with gates or trains operate at speeds under 10 m.p.h. At approximately the same time Metra informed FRA that 130 crossings on their property were no-whistle crossings. Between the year 2000 and 2002 some of these crossings were reported in the inventory as being closed or no longer public. When combined and checked against year 2002 inventory records some 304 Chicago Region crossings were considered no-whistle based upon AAR and Metra sources.

In November of 2002, the ICC provided an updated listing of crossings in the State of Illinois indicating current whistle status (based on actual practice). It showed 278 no-whistle crossings in the Chicago Region and, of those, 226 corresponded with the 304 provided by AAR and Metra. FRA also learned of 29 additional quiet crossings in some other suburban Chicago communities for a total of 385.

To the extent that the ICC and AAR may not have queried all railroads, particularly smaller short line and regional railroads, a few crossings may have been omitted from these counts. The AAR and ICC filings are also notable in omitting lines directly operated by Metra, which is an AAR member. However, it is clear from the AAR's filing, as well as representations made by railroads to the Commission in 1994 and recent lists provided by the Commission, that

the horn has been sounded at the vast preponderance of freight-only crossings in the Chicago Region since at least the 1994 time period.

The following table summarizes the available data for the mid-2000 period, including both partial and 24-hour bans for the Chicago Region:

	Total Crossings in Region (2002)	FRA Updated Nationwid e Study (Jan. 2002)	No-whistle crossings per 8/23/2000 CATS estimates	No- whistle crossings per 10/24/200 0 AAR letter	No- whistle crossings per ICC 11/19/200 2	No-whistle crossings as of 2002 (FRA reconciliatio n)
Commuter			320	227		347
Other			23	28		38
Total	1,671*	846**	343	255	278	385

*Current total from FRA inventory with adjustments for known closures.

**Based on early AAR survey and crossings identified during outreach largely prior to the NPRM.

FRA's reconciliation in effect adds no-whistle crossings on Metra's home lines to the AAR estimates and the information from the ICC. AAR had included the no-whistle crossings on Union Pacific, BNSF, and Wisconsin Central property, but not on Metra owned and operated routes. Again, it is possible that these counts omit a few no-whistle crossings, possibly those on railroads not surveyed by the parties.

E. Community Reaction to the Proposed Rule

Testimony from public officials representing the Chicago Region was reasonably consistent in content. The major Chicago Region groups argued that the collision rate at grade crossings in the Chicago Region is lower than the nation even with whistle bans. They argued that FRA's Inventory data were outdated, that the rule is too costly, and that it would take much longer to implement than FRA had proposed to allow. Chicago commenters also postulated that the Chicago area will be the most impacted by the rule. The general conclusion suggested by most of the commenters was that the Chicago Region (or Illinois as a whole) should be excluded from the final rule and left to implement its own programs, which are said to be better suited to local conditions. This testimony was supported by State-level officials.

FRA is familiar with the efforts of the Illinois Commerce Commission, the Illinois Department of Transportation, Metra, freight railroads, and many counties and cities to improve safety at highway-rail crossings in Illinois, and specifically in the Chicago Region. These efforts are presently well led and well coordinated, and the State contributes significant resources. Nevertheless, in the year prior to the testimony on the proposed rule, Illinois led the Nation in fatalities at highway-rail crossings. The State regularly places second or third in that category, even though collisions and casualties declined over the decade of the 1990s (as they did in the Nation).

This record is driven to a significant extent by the very heavy exposure in the Chicago Region, where every weekday over a thousand trains compete with millions of motor vehicles at almost 2,000 highway-rail crossings. Collisions on major Chicago-area lines are more likely to result in serious injuries or fatalities because of relatively high train speeds associated with commuter service. FRA calls attention to this issue not to be critical in any way, but rather to note the importance of sustained effort by all responsible parties to meet this continuing safety challenge.

FRA thoroughly reviewed all studies, testimony and comments submitted by Chicago-area commenters, including the Speaker of the House of Representatives, other Members of Congress, the Chicago Area Transportation Study (CATS), Northwest Municipal Council (NWMC), Dupage Mayors and Managers, and the City of Chicago, Department of Transportation, among others. FRA also took official notice of testimony before the Subcommittee on Ground Transportation of the Committee on Transportation and Infrastructure, U.S. House of Representatives, on July 18, 2000 (Implementation of the Federal Railroad Administration Grade-Crossing Whistle Ban Law, No. 106-101), which focused heavily on the Chicago Region.

FRA endeavored to fairly evaluate the claim of special circumstances, as well as to take the specific points into account in relation to the National issue posed in this proceeding. What follows is a discussion of FRA's findings, comparing FRA's data and methodologies with those in submissions by Chicago-area groups. We also discuss further the statistical analysis reported above with respect to its significance for the final rule. We conclude that many comments from the Chicago Region have valid application when tempered by other available information, and we call attention to aspects of this rule that reduce the impact of the rule at no-whistle gated

crossings in the region. As described above, FRA also developed a risk-based method for excepting many communities from the train horn requirement. Moreover, this interim final rule provides significantly more time for implementation than did the NPRM.

F. Methodology/Inventory Data

As noted above, Chicago Region commenters generally viewed the grade crossing safety record in the region as good. Many commenters suggested that the train horn could not be an effective warning device in the Chicago setting because of the number of train movements (motorists would become inured to the warning). Thus, it was felt that there was no difference in safety performance between crossings where the horn is sounded and those where it is not sounded. (By contrast, the ICC implicitly recognized the usefulness of the train horn but argued more widespread use of the train horn would not be accepted by the public and was not necessary given existing administrative standards.) FRA has responded to the comments by thoroughly reviewing the underlying data as well as conclusions derived from the data in the NPRM.

To understand the controversy over Chicago data it is necessary to recall several points regarding the Chicago Region at the outset. First, virtually all of the crossings identified during public contacts as of concern to Chicago residents with respect to termination of existing horn exemptions are equipped with flashing lights and gates (gated crossings). Second, as discussed above, the ICC required use of the train horn at some of most hazardous crossings during at least portions of the FRA study period; and, even when the Commission excused use of the train horn, Metra and freight railroads often elected to use the horn notwithstanding public opposition, if any.

It is also necessary to understand some basic information regarding the data that FRA has available to work with. Accident/incident data used in this rulemaking are reported to FRA by the railroads under regulations having the force and effect of Federal law (49 CFR Part 225). The data are available on FRA's public web site at the individual crossing level, so local officials have the opportunity to call any problems to the agency's attention. In general, FRA has every reason to believe that these data are accurate, with the exception that a recently added field to identify the presence of a whistle ban appears to be eliciting information of questionable quality (and FRA has not relied on that field in this proceeding).

The characteristics of crossings (number of tracks, trains, motor vehicle traffic, etc.) are determined by reference to the Department of Transportation's national Inventory of highway-rail crossings, which is maintained by FRA on behalf of all users. This is a voluntary data collection effort, and the degree of cooperation in maintaining its currency varies from year to year and among contributors. Substantially all highway-rail crossings have been assigned Inventory numbers. Both the State departments of transportation (for public crossings) and the railroads (for public and private crossings) are requested to contribute updates to the Inventory whenever circumstances change. Since State departments of transportation receive Federal-aid highway funds for crossing safety and other highway improvements, and since under the section 130 program States are required to maintain a ranking of crossings by degree of hazard in order to plan allocation of funds reserved for crossing safety purposes, it is reasonable to ask the States to share data needed to analyze crossing risk at the National level. It is also reasonable to ask railroads to provide these data, since they have an interest in avoiding collisions at crossings, as

well as liability associated with such collisions. FRA has actively promoted participation in maintaining the Inventory for the benefit of all users.⁹

Some States, and some railroads, are more aggressive than others in providing updated data for the Inventory. When FRA examined the Inventory in the summer of the year 2000, FRA found that the *average* age of the most recent Inventory updates for the State of Illinois was nine years. Except as noted below, FRA's attempts to elicit more recent information from State authorities during the pendency of this proceeding have been largely unsuccessful.

Until recently, the Inventory did not contain a field for the presence of a whistle ban, and FRA has not found notations in the current inventory to be sufficiently complete or reliable. The issue of which crossings have been subject to bans or exemptions during particular periods of time has been resolved through two means. First, in preparing the National Study relied upon in the NPRM, FRA relied to a significant extent upon a survey conducted by the AAR (survey information received in 1992) and on information received during outreach in anticipation of this rulemaking.

Second, FRA has asked commenters in this proceeding to provide the best information that they have available, including a direct request to AAR to update its earlier survey of crossings (response received in October of 2000).

Third, FRA has directly approached public authorities in the Chicago Region asking for information. Finally, in the case of some crossings for which the status was clearly questionable

⁹In 1999, and again in 2002, the Department of Transportation transmitted to the Congress draft legislation that would make submission of current data to the Inventory mandatory for both States and railroads.

(both as to whistle ban status and other data elements), FRA has reviewed railroad documents and conducted site visits.

Given the discrepancies pointed out in the NPRM, FRA has sought to obtain updated Inventory and ban information from the City of Chicago, but that had not occurred more than two years after the requests were made and as this interim final rule was being completed. (Attempting to resolve this data problem has caused significant delay in this rulemaking, as FRA has endeavored to use the best available and most credible information in preparing this interim final rule. However, given the policy choices FRA has made in this interim final rule, a comprehensive resolution of the data problem has not proven necessary.)

Commenters on the NPRM questioned FRA's data, which FRA had characterized as finding a significant effect from silencing the train horn at gated crossings in the Chicago Region. Some of this criticism was direct (challenging the relevant FRA data on gated crossings), and other criticism was indirect (challenging data on passively signed and flashers-only crossings that FRA had published to complete the public record but had noted might be unreliable).

Most Chicago-area commenters were convinced that the whistle ban grade crossing collision rate in Chicago is lower than the rate throughout the rest of the nation, and many contended that the train horn is wholly ineffective. In short, they doubted the conclusion stated in FRA's *Updated Analysis of Train Whistle Bans* (January 2000) that, on average, gated whistle ban crossings in the Chicago Region experienced 58% more collisions than gated crossings with similar predicted risk of a collision at which train horns sounded. Two studies by associations of local governments, discussed below, seemed to indicate different results.

As noted above in the discussion of the Westat reports, FRA initially responded to the comments and analysis by contracting with that statistical firm to regenerate the national study, using the best available information for the study period 1992-1996, to maintain comparability with the earlier work and to avoid what might be temporary effects from the extensive publicity associated with this rulemaking. FRA provided the best available information regarding the status of crossings in Chicago during the study period, along with other necessary data. Westat reviewed the prior FRA method (which it found useful and appropriate), made some improvements in the method, and computed national results, which are reported above. With respect to gated crossings in the Chicago Region, Westat found as follows:

For grade crossings with gates, the estimated effect of a whistle ban depended on the comparison group in the Chicago area. . Using the Continental U.S., Florida and Chicago area excluded, as the comparison group, grade crossings with gates without a ban had a significantly lower accident rate than grade crossings with a ban, whereas using the Chicago area grade crossings with no ban for comparison, there was no statistically significant effect associated with a ban.

Zador, Paul L. at 6 (April 1, 2002).

Stated differently, during the study period Chicago Region gated whistle ban crossings experienced an average of 34% more accidents than similar crossings in the Nation where the train horn was sounded. The results were statistically significant but as noted above a further statistical test indicated poor model fit.

Accordingly, as FRA endeavored to bring together the various sources of information and analysis in preparation of this interim final rule, FRA made further inquiry into the distribution of no whistle crossings with the conclusions recited above. FRA then provided the corrected set

to Westat for further analysis. Recognizing that the current no-whistle status could not be assumed to be valid for the earlier period, during which substantial ICC and railroad decision making had no doubt resulted in major changes in status, FRA also provided a more recent accident data set (1997-2001).

As noted above, the result was that, for gated crossings (by far the largest component of the Chicago Region issue), it was determined that no-whistle policies resulted in an increase of 17.3% in accidents. This value was not supported by a very high level of statistical confidence. Accordingly, FRA was left with three options:

Elect to determine that the Chicago analysis was inconclusive, that the statute requires FRA to find that the train horn has been fully compensated for, and that the logical alternative was to employ national averages (with or without inclusion of the Chicago data).

Take note of the negative impact results yielded by the comparison of Chicago train horn and Chicago no-whistle crossings, and determine the impact of no-whistle policies in the Chicago Region to be zero, at least for pre-rule no-whistle crossings; or

Note the Westat finding that the Chicago crossings are in fact different in their characteristics and accept the most recent Westat estimate (17.3%) of the effect of whistle bans on accident rates at gated Chicago Region crossings, either for all quiet zones, or for Pre-Rule Quiet Zones only.

The first option of using national averages for the entire Nation, including Chicago, would have been employed by FRA if the Chicago Regional data were not available or their use inappropriate. FRA could have rationally decided that the limited significance of the Chicago Region statistical conclusions did not require reliance on those conclusions. This would have

resulted in a fully functional and appropriate interim final rule consistent with the Act; a rule FRA would not have hesitated issuing. However acceptable this option was, it would have necessitated according little weight to a sizable body of testimony from the Chicago Region together with statistical analysis and qualitative knowledge of the Chicago Region's unique characteristics (discussed further below).

The second option would require FRA to ignore the reality of discretionary selection and the strong evidence based on other national data (memorialized in the statute giving rise to this rulemaking as well as the laws of most States, including Illinois), that the train horn can make a positive contribution at the margin. FRA believes this option would not have been a rational choice.

FRA has chosen the third option, and has further determined that the lower estimate of ban impacts should be applied *only to crossings in Pre-Rule Quiet Zones*. The need to determine the impact of no-whistle policies on accident rates derives from the statutory definition of supplementary safety measures. The statute permits certain crossings to be excepted from the requirement to sound the train horn, including crossings for which, *in the judgment of the Secretary*, supplementary safety measures fully compensate for the absence of the warning provided by the locomotive horn [emphasis supplied]. As delegate of the Secretary, FRA makes this judgment in light of the following considerations:

- Utilizing an estimate of approximately 17%, despite the limited statistical significance of the estimate, takes advantage of the best and most current analysis available and fully recognizes the conclusion of the Westat report that the ban effect for gated crossings was significantly different in the Chicago area . . .

- Not only was the input data set of no-whistle crossings for the final Westat study much improved from the prior work, but the time period of the study included the period when several Chicago-area jurisdictions were making special efforts to address crossing risk, particularly where no-whistle policies were in place. Reliance on the lower estimate has the practical effect of rewarding effort already expended, taking into account scores of comments by Chicago area officials and residents as well as the interests of communities wishing to retain existing no-whistle policies.
- The recent study takes into consideration other variables that may have closed the risk gap in the region, particularly completion of the retrofit of auxiliary alerting lights, as well as special efforts made in the region (e.g., Metra's election to utilize both low-mounted ditch lights and oscillating lights, rather than just ditch lights).
- Use of the lower estimate is fully consistent with what FRA understands regarding the application of no-whistle policies, i.e.,
 - Discretionary selection has almost certainly occurred in the region. Under current State law (which will be preempted by this interim final rule), railroads have the latitude to sound the horn or refrain from sounding the horn at individual crossings excepted from train horn sounding.
 - Following their interest in safety and limitation of liability, overall railroads likely have elected to use the train horn where risk is higher or have exacted responsive action from communities to compensate for use of the train horn.
 - The most extensive use of no-whistle policies has been made on commuter lines where many trains are scheduled, train counts are high, and motorists are thus more likely to expect a train. Although the absolute effect of silencing the horn at

these crossings is still a matter of substantial concern given the high exposure at these crossings, the proportional effect of silencing the train horn is lower (again, because motorists are conditioned to believe the train will come, most trains are very conspicuous with two forms of alerting lights, and B on lines where commuter trains are predominant B motorist tolerance of delays is reduced by the expectation that the train will clear the crossing rapidly).

FRA believes that the combination of these various factors provides a fully rational basis for selecting this option over the equally rational first option and the unsupportable second option, described above. FRA notes that the application of this lower effectiveness rate for the train horn to pre-rule, no-whistle gated Chicago Region crossings does not mean that the acceptable risk at those crossings will be measured differently. To the contrary, those crossings will be subject to the same Nationwide Significant Risk Threshold as all other pre-rule, no-whistle crossings. The unique effectiveness rate, which applies only at Chicago Region gated crossings, determines only the amount of reduction that may be required to meet this national risk standard. FRA believes that a reduced estimate of ban-induced accidents at grade crossings is appropriate for existing (pre-rule) no-whistle crossings. However, a reduced estimate would not be appropriate for current crossings in the Chicago Region where the train horn presently sounds, should those communities desire New Quiet Zones. Even on the commuter rail network, the risk characteristics of those crossings may be substantially different (e.g., more difficult geometry or sight distances, less local commitment to enforcement, etc.) Indeed, the comparisons between train horn and no-whistle crossings in the region confirm that a reduced estimate at the 17 percent level would not be appropriate for those crossings. Nor can FRA say that there is an intermediate level, which is well supported empirically or judgmentally.

Accordingly, FRA will apply the national estimate of ban impacts to New Quiet Zones in the Chicago Region.

FRA recognizes the potential down side of qualifying Pre-Rule Quiet Zones using a lower estimate of ban effects. It is possible that some or all of the difference in performance has to do with factors that are beyond the control of this interim final rule. For instance, the extensive coverage of this rulemaking by the Chicago media will end as the rule is implemented, and that may result in future motorist behavior that is less favorable than in the past. Changes in local risk to which railroads might previously have reacted by resuming use of the train horn may become a source of concern, given the mandate of the rule to run silent through Pre-Rule Quiet Zones that have been qualified under the new procedures. Accordingly, FRA will monitor results in the region and consider further action as indicated.

Note on Intra-Regional Comparisons

Commenters in the proceeding also asked FRA to compare Chicago ban crossings to Chicago crossings where the train horn sounds, and FRA charged Westat with including that element in its analysis. As noted above, Westat reported that no statistically significant effect from the train horn was found when Chicago Region gated crossings, where the train horn sounds, are compared with the Chicago Region whistle ban crossings. This is neither surprising nor in conflict with the hypothesis that the train horn is useful. No accident prediction formula can capture all factors present at individual crossings, and in Illinois railroads have the latitude under law to sound the horn at exempt crossings. It is logical to expect that railroads would as matters of discretion elect to sound the horn at crossings with very high known accident potential (given factors such as roadway geometry, accident history and observed motorist behavior), at least in those cases where community objections to noise are not sufficiently strenuous to

convince them otherwise. Further, in those cases where the railroads did not make this election and the accident counts rose significantly, the ICC could eventually be expected to intervene. Neither the railroads nor the ICC could be expected to go too far in the direction of discretionary use of the train horn, however, given vocal community objections.

The result has been, FRA believes, that the train horn is sounded as a matter of discretion at many (but by no means all) of the very riskiest crossings in the region that may technically have been considered whistle ban crossings due to an exemption from the State mandate to use the horn; and, even though the risk is reduced by the train horn, these crossings nevertheless remain among the riskiest in the region.¹⁰ This discretionary selection has indeed had the effect of abating significant risk in the region, but it follows from this discussion that ***the resulting statistical pattern within the region does not in any way call into question the potential for risk reduction at the remaining crossings where the horn is silenced.*** To the contrary, FRA anticipates that requiring that the train horn be sounded at remaining whistle ban crossings in Chicago would reduce accident risk at those crossings, on average, about 15 percent.¹¹

¹⁰Many of these very high risk train horn crossings would also benefit substantially from safety improvements such as four-quadrant gates, traffic channelization, or photo enforcement; and public investments would be recovered through reduced loss of life and injuries avoided. FRA will continue to encourage use of these techniques wherever they may be useful. While that is not the subject of this proceeding, the pendency of this proceeding has the benefit of calling attention to these possibilities for risk reduction that cannot be achieved using “standard” crossing safety measures.

¹¹A 17.3% increase to a base amount yields a value of 117.3% (risk after implementation of a no-whistle policy). Restoring use of the horn would reduce the risk to a level 100% of the prior level. Seventeen and three-tenths is 14.7% of 117, so restoring the inflated value to the base amount is a 15% reduction to the no-whistle state, after rounding.

Studies Provided by Commenters

In response to the NPRM, CATS (Hafeez and Laffey) performed a separate study of the effects of whistle bans in the Chicago area and concluded that whistle bans have no effect on the collision frequency in the Chicago area. Following receipt of the CATS study, FRA asked Westat to review that report and provide an evaluation.

The CATS study used a statistical technique called Analysis of Variance (ANOVA) to determine if grade crossings that had a whistle ban experienced a higher collision rate in comparison to grade crossings where train horns are routinely sounded. This method tested the statistical significance of the effect of a whistle ban on collision frequency using the interaction between device type and whistle ban. Westat found that, besides warning device class, this method failed to account for any of the other factors that are known to affect collision rates, such as daily train and traffic frequencies, train speed, number of highway lanes, and number of tracks. Furthermore, grade crossing collisions are rare event that are not normally distributed, but rather follow a Poisson distribution. The CATS study applied a technique designed for use with normally distributed data that does not work well for data that are not normally distributed. The result of applying this model was residuals that were not normally distributed. According to Westat, the omissions of factors known to affect collision rates coupled with an improper technique rendered the model poor for the purpose of analyzing the effect of whistle bans on collision rates.

Disagreements about methods notwithstanding, Hafeez and Laffey come to essentially the same conclusion as the Westat analysis, i.e., Chicago Region no-whistle crossings may be safer on average than Chicago Region train horn crossings, at least when only certain factors are

controlled in the analysis. As we have explained above, this is not a surprising outcome when discretionary selection is considered.

Further, given the analytical methods used and the small data sets available for analysis, it would be as easy for confounding variables to mask any differences as it is alleged by commenters to be for such variables to generate specious differences. Consider, for instance, that most of the Chicago-area no-whistle crossings are on the commuter rail network, while most of the train horn crossings are on lines used exclusively or almost exclusively for freight. (Hafeez and Laffey also used the same, inflated data set of no-whistle crossings that FRA had used in its earlier analysis, which was the best available at the time. It contained large numbers of freight-only crossings where the train horn was likely sounded during much of the period.)

The Northwest Municipal Conference (NWMC) also filed comments in this docket and attempted a statistical re-analysis of accident risk within its territory using the FRA method as reported in the NPRM and Nationwide studies. This analysis also compared local area train horn crossings with exempt crossings where railroads have elected to run silent. It concluded that train horn crossings are no safer than no-whistle crossings, whether one compares all crossings or just gated crossings. FRA determined that NWMC's analysis did not follow the FRA procedure appropriately, particularly as to stratification of the sample. Nevertheless, as noted above, FRA has determined that comparisons, between Chicago train horn crossings and no-whistle crossings, cannot properly evaluate train horn usefulness within the context of the Chicago Region, since discretionary selection has likely shifted a disproportionate number of the most hazardous exempt crossings into the train horn category and other confounding variables may apply.

The NWMC analysis concludes the whistle ban is likely a spurious variable in the FRA analysis. It argues the factors used in the APF, such as train and automobile traffic, account for current accident levels rather than the whistle ban because the APF accounts for almost 80% of the variation in accidents. FRA's current approach adjusts for these effects. It is based on a Poisson regression that includes the factors used in the APF along with the whistle ban.

Implications of the Various Studies

This interim final rule endeavors to ensure that, to the extent practicable, these decisions are made based on safety rather than economic or political influence, with the important additional difference that communities have the option of insisting that the horn be silenced where supplementary or alternative safety measures are put in place (or where no significant risk is determined for the corridor).

Again, FRA is keenly aware of the hazard that a spurious variable can confound statistical analysis and designed the stratified/matched pair method used in the national studies specifically in an effort to avoid that effect. FRA has also performed longitudinal studies, as reflected in the Florida report and case studies embodied in the Nationwide report. In every case where FRA has had sufficient valid data points to draw meaningful conclusions, the effect of the train horn has been confirmed, lending empirical confirmation of the following: the judgment implicit in ICC exemption management (that restoring use of the train horn can lower risk); human factors research; State laws requiring use of the horn; the opinions of railroad professionals who are exposed to motorist behavior on a daily basis; and the assumptions Congress made in enacting the law that required FRA to issue this rule.

In any event, FRA strongly agrees with the NWMC comment that it is best to utilize a method that is responsive to demonstrable regional differences, where possible; and the interim

final rule follows this pattern. The result is a significant reduction in effort that would need to be expended to institute quiet zones in the Chicago Region.

In conclusion, the comments related to safety at gated crossings, taken together with subsequent statistical analysis, support reconciliation of FRA safety concerns with the strenuously argued representations of the State and local jurisdictions that they are actively promoting safety at highway-rail crossings. The bottom line is that Chicago-area railroads and the ICC have acted to employ the train horn at many of the most hazardous crossings, but it is very probable (in FRA's judgment) that excess risk continues to be unabated at many no-whistle crossings where the train horn is silenced. This interim final rule offers the region automatic approval of the demonstrably safest quiet zones and, for quiet zones exhibiting higher degrees of risk, a mechanism for implementing supplementary and alternative safety measures, over a longer period of time and at lower cost than originally proposed, with the result that existing quiet can be preserved and New Quiet Zones can be established with a reasonable degree of confidence.

G. Chicago Anomaly

In the NPRM at page 2234, FRA reported results of the *Updated Analysis of Train Whistle Bans*, January 2000, which examined data for the five-year period from 1992 through 1996 (Updated Nationwide Study). The most widely cited passage in that analysis reads as follows:

The updated analysis also indicated that whistle ban crossings without gates, but equipped with flashing light signals and/or other types of active warning devices, on average, experienced 119 percent more collisions than similarly equipped crossings without whistle bans. This finding made it clear that the train horn was highly effective in deterring collisions at non-gated crossings equipped only with flashing lights. The only exception to this finding was in the Chicago area where collisions were 16 percent less frequent. This is a puzzling anomaly. One possible explanation for this result is that

more than 200 crossings (approximately one third of the crossings in Chicago) still included in the DOT/AAR National Inventory have in all likelihood been closed. They would continue to be included in the Inventory until reported closed by State or railroad officials. (At this time submission of grade crossing Inventory data to FRA is voluntary on the part of States and railroads.) FRA believes this could contribute to the low collision count for Chicago area crossings without gates. Collisions cannot occur at crossings that have been closed. The retention of closed crossings in the Inventory would, therefore, have the effect of incorrectly reducing the calculated collision rate for the Chicago area crossings.

The Nationwide study showed a similar unexpected result for passively signed crossings in the Chicago Region.

Over three years after this analysis was published, FRA still has not received a full update of the Inventory for the City of Chicago, despite frequent requests. FRA did, however, test its thesis that the data set is not suitable for analysis by checking crossing status directly with railroads and through site visits to a representative sample of crossings. The result is that, based on current conditions many of the crossings identified in the Inventory have long since been closed (over half of the passive crossings and almost a third of flashers-only crossings) or the type of warning device has changed. It is logical to assume that the remaining crossings have experienced other changes since the last inventory records that may have further confounded the analysis.

More importantly, when post-NPRM filings from the ICC, AAR and Metra were examined and compared with declarations in the ICC proceeding during the period 1988-1994, it became evident that there likely were very few passively-signed and flashers-only crossings that were in no-whistle status during the most of the study period 1992-1996. Certainly there are very few today B too few to yield meaningful comparative data towards a regional estimate.

As explained above, FRA finds no reason to apply estimates other than the national averages to these categories of crossings. Since the crossings equipped with flashing lights only

or passive devices are generally low-train-speed and single-track crossings, FRA knows of no supportable reason why there should be a special effect in the Chicago Region at those crossings. Indeed, *since the ICC did not excuse use of the train horn at passive crossings*, it is likely that no bans have been observed at those crossings during the period or as suggested by the AAR in its October 2000 filing that this has occurred only at crossings where train speeds were less than 10 mph, which is typical only within yards and on track approaching industries. Accordingly, National averages are appropriate for use under this interim final rule for both passive crossings and flashers-only crossings.

H. Safety Trend Line

Chicago-area and other Illinois respondents asked FRA to consider the improving safety record at grade crossings before imposing a train horn requirement. CATS noted that collisions at crossings in Northeast Illinois had declined 59 percent since 1988. FRA recognizes that the safety record at Chicago Region crossings has improved markedly during the last several decades, and this is also true for the State of Illinois and for the Nation as a whole. These gains have resulted from expenditure of Federal and State funds on improved warning systems, local and National public awareness efforts sponsored by a variety of parties (including U.S. DOT and the States through Operation Lifesaver, Inc.), improved engineering of highway-rail crossing and related traffic control systems, installation of alerting lights on locomotives and cab cars, general efforts devoted to improving highway safety (e.g., seat belt campaigns, impaired driver campaigns, etc.), closure of redundant crossings, and targeted law enforcement in some local jurisdictions supported by a 1995 Illinois State law imposing a high monetary penalty for disregarding warning systems at crossings. It is also possible that freight railroads operating in Illinois have been more aggressive in sounding the horn since the publication of FRA's Florida

and National studies (as they have been in other jurisdictions where permitted to do so by repeal of bans or as a result of favorable Federal court rulings).

As noted above, FRA has further updated its safety analysis to capture developments in the period 1997-2001. The result is a much lower estimate for current ban-induced risk at Chicago gated crossings the great majority of no-whistle crossings in the regions.

I. Accident-Free and Low Risk Jurisdictions

Chicago-area commenters, including the Northwest Municipal Conference, were prominent among those arguing that extended periods of safe outcomes at local crossings should be recognized. As explained elsewhere in this preamble, the interim final rule provides a conditional exclusion for existing whistle bans where all crossings in the jurisdiction have been collision-free for the past 5 years, provided the projected risk is below the product of two times the Nationwide Significant Risk Threshold. The interim final rule employs a risk-based approach that credits good safety results. In fact, some existing whistle ban jurisdictions may be able to avoid additional costs indefinitely provided their safety record stays within the required parameters outlined in the interim final rule.

J. Impracticability

Many Chicago-area commenters were particularly strong in making the point that several of the identified supplementary and alternative safety measures would not work in their local communities. Although many of these comments are discussed in other portions of this preamble, it is appropriate to call attention to three safety alternatives to the horn, which were cited as impractical due to local conditions in the Chicago area or in Illinois generally.

First, FRA was told that four-quadrant gate systems were not permitted by the Illinois Commerce Commission. Since that testimony, the MUTCD, which is issued by the Federal Highway Administration and supported by a national committee of traffic control experts, has been amended to specify criteria for four-quadrant gates as a standard warning system at highway-rail crossings. This action signals the acceptance of this safety system by professional traffic safety experts. Further, the Illinois Department of Transportation has funded installation of a large number of four-quadrant gates at crossings on the designated high-speed rail corridor between Chicago and St. Louis via Springfield, with ICC participation. The ICC has also stepped forward to demonstrate a low-cost vehicle presence detection system for use with four-quadrant gates. FRA believes that the Illinois Commerce Commission will continue to respond appropriately to identified needs for four-quadrant gate systems.

Second, FRA was told that photo enforcement is not authorized under Illinois law at highway-rail crossings. Photo enforcement for red-light running (and to a lesser extent for excessive speed) is becoming standard practice in a growing number of jurisdictions nationwide. After some initial difficulties related to program design and judicial acceptance, a photo enforcement project in the Chicago Region is continuing with the promise of positive results. There are currently four crossings in the Chicago Region that are equipped with photo enforcement (Downers Grove, Naperville, Wood Dale and Winfield each have one crossing so equipped). The Naperville installation has been in effect since July 2000. There has been an 87% reduction in violations of the warning devices at the crossings, and there has been a 98.5% conviction rate of the citations issued. The Wood Dale installation, which has been in service since December 1999, showed a 47% reduction in violations as reported in September 2000. Both the Downers Grove and Winfield systems are relatively recent but the initial reports are

favorable. The timetable set forth in this rule allows ample time for results of the current demonstration to be communicated to the legislature and for the legislature to authorize photo enforcement.

Third, FRA heard from many jurisdictions in the Chicago Region that median barriers would not work in their settings because of major roadways that run parallel to rail lines, either on one side or on both sides of the rail line. FRA has noted these circumstances in visits to the communities, and FRA concurs that median barriers as specified for supplementary safety measures in the NPRM will not work at many locations. FRA has responded by making the requirements for channelization more explicitly flexible in the appendix language describing alternative safety measures. FRA has made it clear, for instance, that channelization on one side of the rail line or for a shorter distance than the 60-100 feet nominally desired could qualify for a risk reduction credit. FRA has also recognized that at many locations channelization is not feasible, and this has been taken into consideration as the costs and benefits of the interim final rule have been assessed.

Finally, FRA has taken seriously the concerns expressed with respect to the cost associated with verifying risk reduction following implementation of public education and enforcement programs. FRA has joined forces with the ICC and local communities to implement the Public Education and Enforcement Research Study (PEERS) program. This education and outreach effort will be evaluated for effectiveness at the community level and, if successful, could have potential for application across the region. Although FRA cannot state specifically how this approach might be integrated into this rule until results are known, it does offer an additional possibility for achieving the safety goals of the rulemaking at relatively low cost.

K. Costs

Chicago respondents testified that the cost of installing Supplemental Safety Measures (SSMs) or implementing Alternative Safety Measures (ASMs) that will permit the creation of quiet zones far exceeds cost estimates developed by FRA and represents an unfunded Federal mandate. The City of Chicago, Department of Transportation commented the rule would force the installation of four-quadrant gates at 237 crossings in the City. The Chicago Area Transportation Study estimated that the cost to implement quiet zones in the CATS region would be \$200 million.

However, these arguments stem from the presumption that all crossings within a quiet zone will need to be equipped with four-quadrant gate systems. Other SSM's were dismissed by Chicago commenters as impractical for a variety of reasons. CATS Council of Mayors Executive Committee argued that the proposed safety measures are unworkable.

To test these criticisms, FRA conducted a preliminary cost analysis associated with implementation of quiet zones in several Chicago-area communities. The site-specific analysis was conducted at 12 highway-rail grade crossings in the communities of LaGrange, Western Springs and Hinsdale, and in each instance employed a corridor approach.

The analysis revealed that in some cases, public education efforts and increased enforcement of existing highway-rail crossing laws can be used in place of engineering solutions. At crossings where engineering improvements would be the most practical approach, the study found the costs of implementing a variety of SSM's would be significantly less than Chicago commenters estimated. Based upon the earlier estimates for effects of no-whistle policies in the Chicago Region, it was estimated that by utilizing the corridor risk reduction approach and

utilizing engineering improvements at selected crossings that the total construction cost for these corridors would be \$360,000 with an annual maintenance cost of \$37,000. This is much less than estimates received from some commenters who erroneously assumed that four-quadrant gates would be required at each crossing. Actual costs under this rule should be even lower, since on many corridors, the required risk reduction of 15% can be taken at a single crossing.

In light of the greater flexibility of the interim final rule with respect to existing whistle bans, and the menu of engineering options, costs to convert existing whistle bans into quiet zones, or even create New Quiet Zones will be significantly less than most Chicago commenters estimated in responding to the NPRM. In instances where an existing quiet zone falls below the Nationwide Significant Risk Threshold, the only costs that would be incurred would be for maintenance of the Inventory data and posting of No Train Horn signs at crossings.

FRA understands the concern of commenters that paying for SSMs or ASMs where necessary to preserve or create a quiet zone may pose some fiscal hardships for some communities. Although this rule will not cost in excess of \$100 million in any year, and thus is not subject to the assessment requirements of the Unfunded Mandates Reform Act of 1995, FRA has made every effort to limit the burdens that this rule imposes and to concentrate those burdens where the safety rationale is most compelling.

L. Time for Implementation

Chicago respondents also argued that the time frame proposed for implementation of quiet zones was too short. The Illinois Commerce Commission projected that it would take ten years to implement the required safety measures. CATS Council of Mayors Executive Committee's estimate was as long as 15 years. They argued that the time it would take to do the work in more than 200 communities in the Chicago Region alone would overburden the railroad industry, tax Federal resources beyond their capacity to deliver, and be more of a burden than the railroad construction industry could handle within the required time frame. These arguments were generally based on the presumption that all crossings would need to be equipped with four-quadrant gate systems. Nevertheless, FRA gave careful consideration to this concern, and has provided significant additional time to implement quiet zones while also attempting to reduce the number of corridors for which supplementary or alternative safety measures will be required.

15. E.O. 15 Status

Emergency Order 15, issued in 1991, requires the FEC to sound locomotive horns at all public grade crossings. The Emergency Order preempted state and local laws that

permitted nighttime bans on the use of locomotive horns. Amendments to the Order did, however, permit establishment of quiet zones if supplementary safety measures were implemented at every crossing within a proposed quiet zone. The supplementary safety measures specified in the Order, although similar, are not the same as those contained in this Interim Final Rule. The SSMs and the conditions on their implementation contained in this rule, provide communities substantially greater flexibility in creating quiet zones than those in the Order. So as not to adversely affect Florida communities along FEC tracks by imposing different standards for establishing quiet zones than along other Florida rail lines or elsewhere in the Nation, FRA will rescind E.O. on **[INSERT DATE ONE YEAR FROM THE DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, the effective date of this rule. At that time, the provisions of this rule will apply to all grade crossings within the State of Florida. Some communities along the FEC (communities subject to E.O. 15) may wish to establish New Quiet Zones following the effective date of this rule. FRA is not at this time calculating the effect of silencing the train horn along that corridor because information gathered in response to the NPRM was not sufficient to make such estimate and because the actual rate of increase experienced during the period studied prior to issuance of E.O. 15 requires re-examination to determine whether it remains valid in light of changed circumstances. FRA will determine whether to apply a regional estimate as to the effect of silencing the train horn at E.O. 15 crossings based on comments submitted in response to this interim final rule or through supplementary fact finding prior to the rescission of E.O. 15. FRA will issue the necessary finding well before the effective date of this interim final rule.